



CASCADE INDUSTRIAL CENTER – BUILDING 1

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 1 rev1
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 1 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial, residential, and rural properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 1 outlined in red.

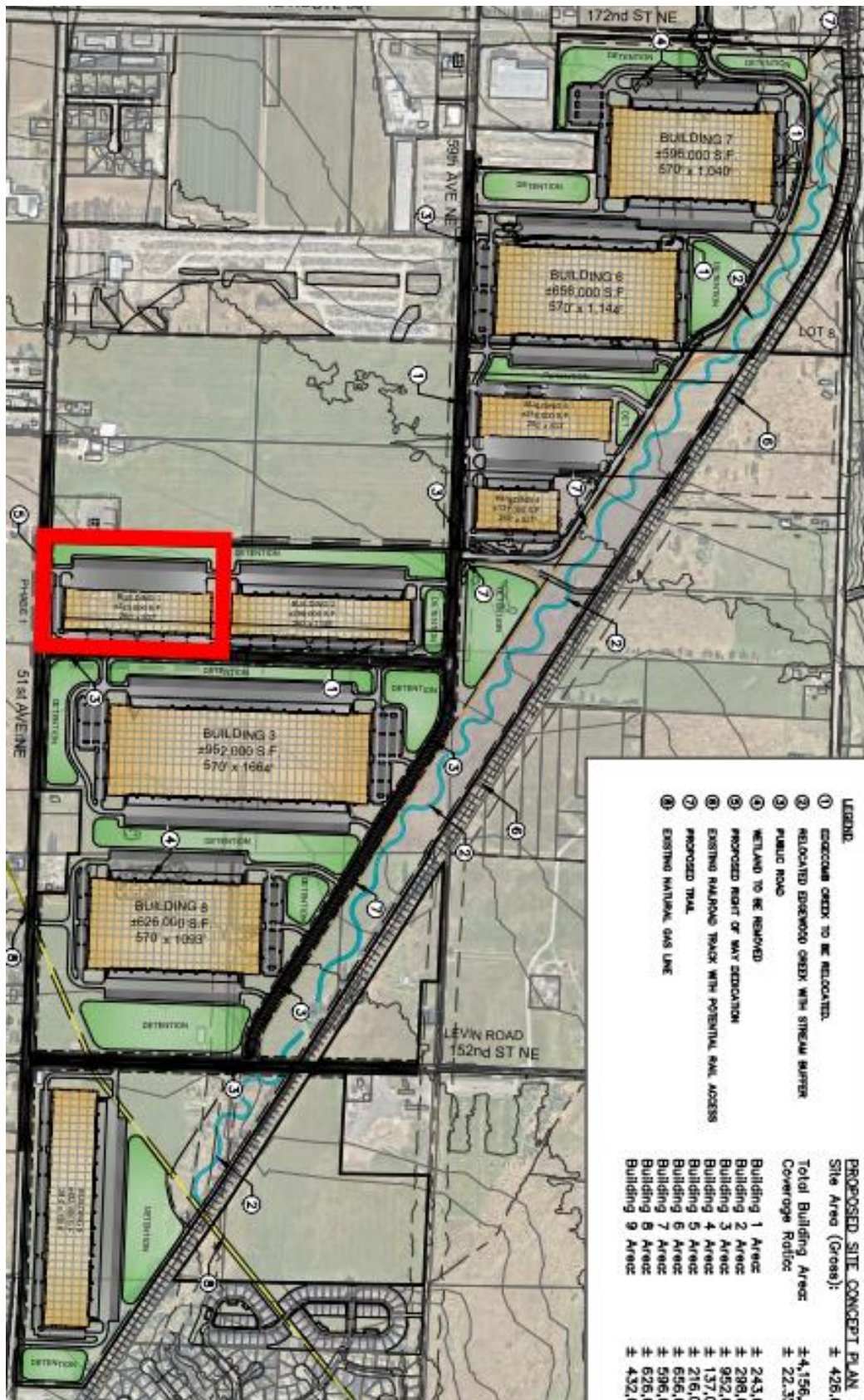


Figure 1: Cascade Industrial Center

II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
North	Marysville	LI	Industrial
South	Marysville	LI	Industrial
West	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

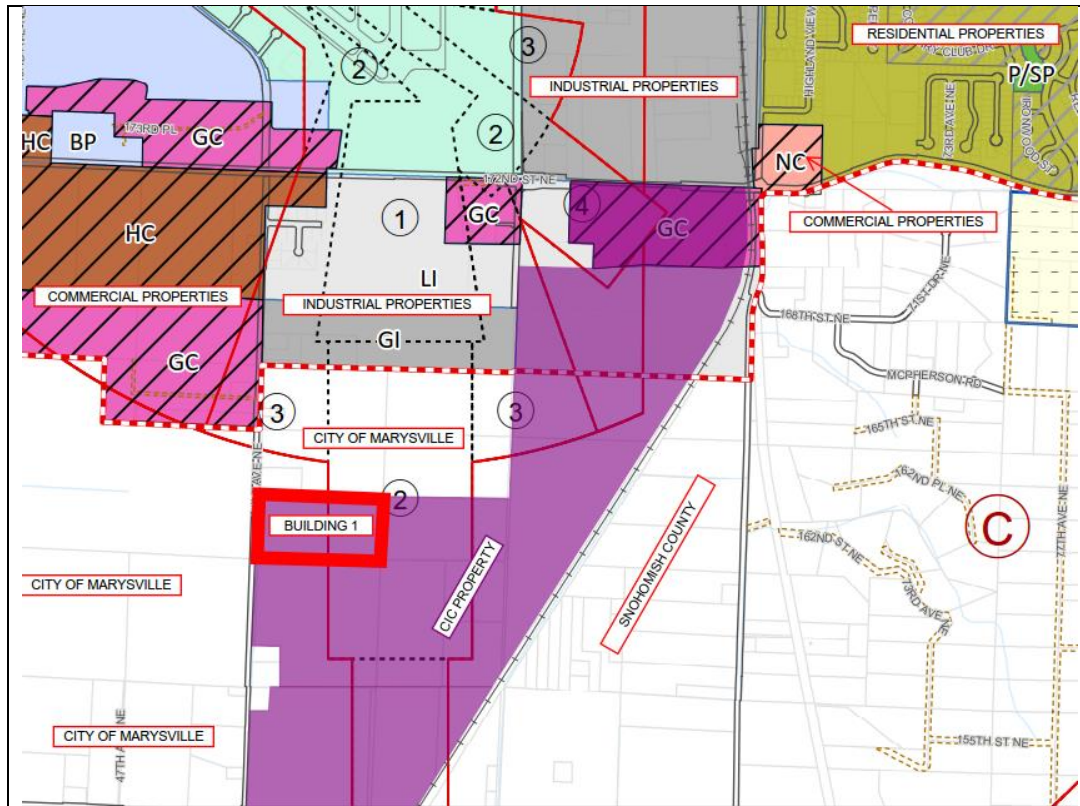


Figure 2: Site and Surrounding Properties – City of Arlington

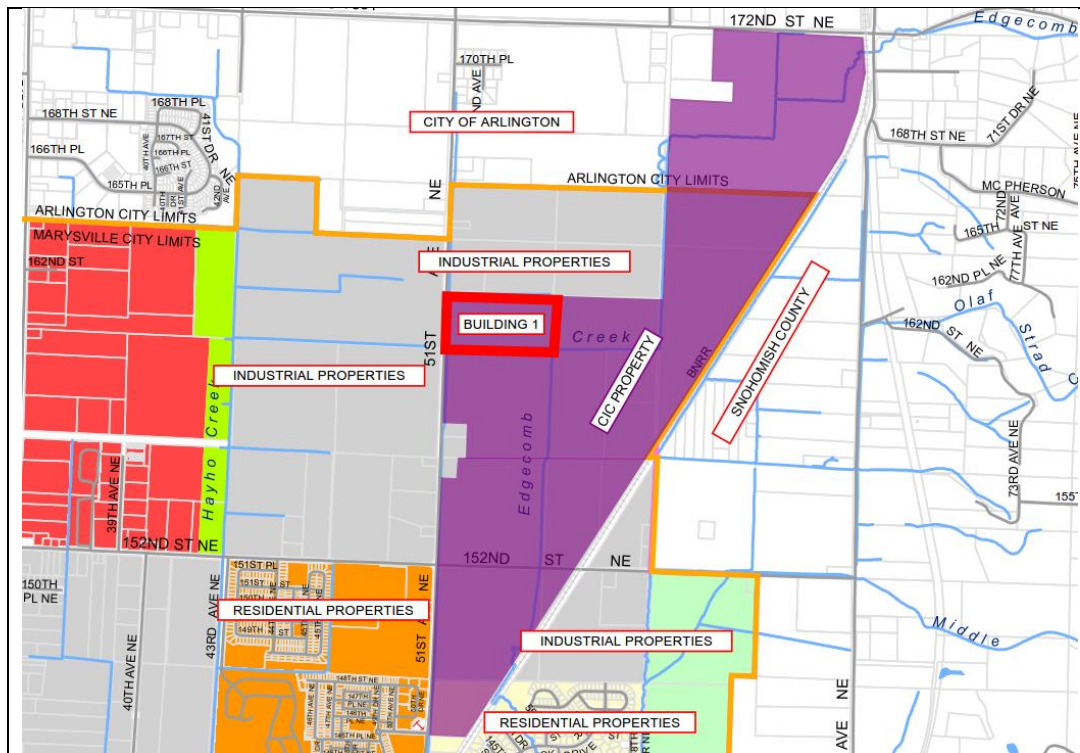


Figure 3: Site and Surrounding Properties – City of Marysville

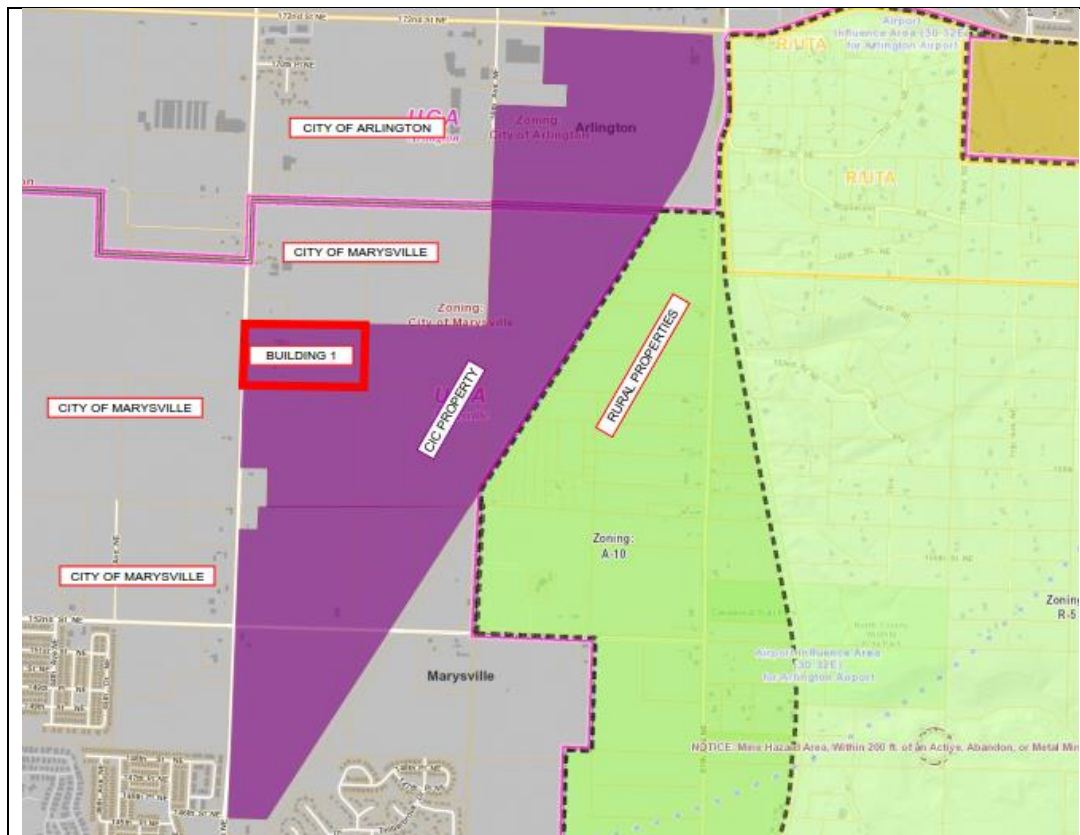


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours only, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15 minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Existing Ambient Noise Levels

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to the site is on the west side from 51st Ave NE.
 - The building has one loading dock on the north side of the building with 54 truck bays.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the south and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	N Loading Dock	5,800
		Truck Maneuvering	5,800
Northwest	Class B	N Loading Dock	950
		Truck Maneuvering	900
North	Class B	N Loading Dock	3,100
		Truck Maneuvering	3,100
Northeast	Class B	N Loading Dock	5,500
		Truck Maneuvering	5,500

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	N Loading Dock	3,100
		Truck Maneuvering	3,100
South	Class A	N Loading Dock	4,500
		Truck Maneuvering	4,500
North	Class C	N Loading Dock	250
		Truck Maneuvering	150
South	Class C	N Loading Dock	1,300
		Truck Maneuvering	1,350
West	Class C	N Loading Dock	250
		Truck Maneuvering	150

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	N Loading Dock	2,100
		Truck Maneuvering	2,100

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the average weekday traffic volume generated at building 1 will be 97 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 15 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	15

There are estimated to be a maximum of 15 trucks travelling to/from the loading docks of building 1 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

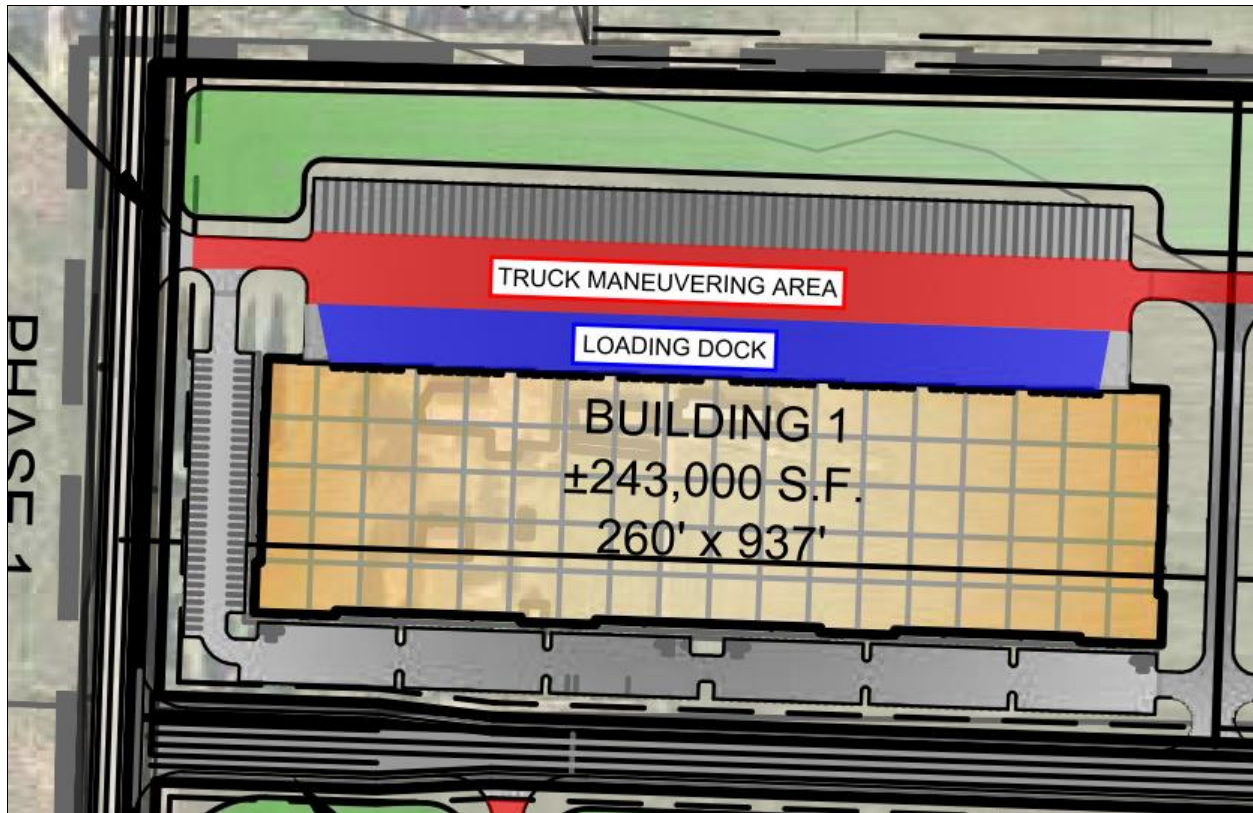


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit	75 dBA at 25 feet
Heavy truck idling	72 dBA at 25 feet
Truck engine starting	74 dBA at 25 feet
Roller door opening/closing	65 dBA at 25 feet
Air brakes	65 – 75 dBA at 25 feet
Pallet being dragged and dropped	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc.	60 dBA at 25 feet

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 30 seconds. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the northwest, north, and northeast; and the nearest Class C EDNA properties to the north, south, and west. The building will effectively block noise associated with the loading docks to the south and southwest receiving properties.

Predicted Noise Levels – Truck Transit

The following are the predicted noise levels from the truck transit events to each of the receiving properties. Predicted levels are compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	5,800 ft	-47	0	28	30	42	15	19
SW	75	25 ft	3,200 ft	-42	-10	23	30	37	15	14
South	75	25 ft	4,500 ft	-45	-10	20	30	35	15	11
East	75	25 ft	2,200 ft	-39	-0	36	30	51	15	27

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NW	75	25 ft	900 ft	-31	-0	44	30	59	15	35
North	75	25 ft	3,100 ft	-42	-0	33	30	48	15	24
NE	75	25 ft	5,500 ft	-47	-0	28	30	43	15	19

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	250 ft	-20	-0	55	30	70	15	46
South	75	25 ft	2,300 ft	-39	-10	25	30	40	15	16
West	75	25 ft	150 ft	-16	0	59	30	74	15	50

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \text{LOG}(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(\text{SEL}) + 10 \cdot \text{LOG}(\text{Events per Hour}) - 10 \cdot \text{LOG}(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following are the predicted noise levels from truck idling events to each of the receiving properties. Predicted levels are compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	5,800 ft	-47	-0	25
SW Class A	72	25 ft	3,100 ft	-42	-13	17
South Class A	72	25 ft	4,500 ft	-45	-13	14
East Class A	72	25 ft	2,200 ft	-39	-0	33

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	72	25 ft	950 ft	-32	-0	40
North Class B	72	25 ft	3,100 ft	-42	-0	30
NE Class B	72	25 ft	5,500 ft	-47	-0	25

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	300 ft	-22	-0	50
South Class C	72	25 ft	2,300 ft	-39	-13	19
West Class C	72	25 ft	275 ft	-21	-0	51

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following are the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration (no more than a few seconds) and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	5,800 ft	-47	-0	27
SW Class A	74	25 ft	3,100 ft	-42	-13	19
South Class A	74	25 ft	4,500 ft	-45	-13	16
East Class A	74	25 ft	2,200 ft	-39	-0	35

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	74	25 ft	950 ft	-32	-0	42
North Class B	74	25 ft	3,100 ft	-42	-0	32
NE Class B	74	25 ft	5,500 ft	-47	-0	27

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	300 ft	-22	-0	52
South Class C	74	25 ft	2,300 ft	-39	-13	21
West Class C	74	25 ft	275 ft	-21	-0	53

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following are the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration (no more than a few seconds) and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	5,800 ft	-47	-0	28
SW Class A	75	25 ft	3,100 ft	-42	-13	20
South Class A	75	25 ft	4,500 ft	-45	-13	17
East Class A	75	25 ft	2,200 ft	-39	-0	36

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	75	25 ft	950 ft	-32	-0	43
North Class B	75	25 ft	3,100 ft	-42	-0	33
NE Class B	75	25 ft	5,500 ft	-47	-0	28

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	300 ft	-22	-0	53
South Class C	75	25 ft	2,300 ft	-39	-13	22
West Class C	75	25 ft	275 ft	-21	-0	54

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

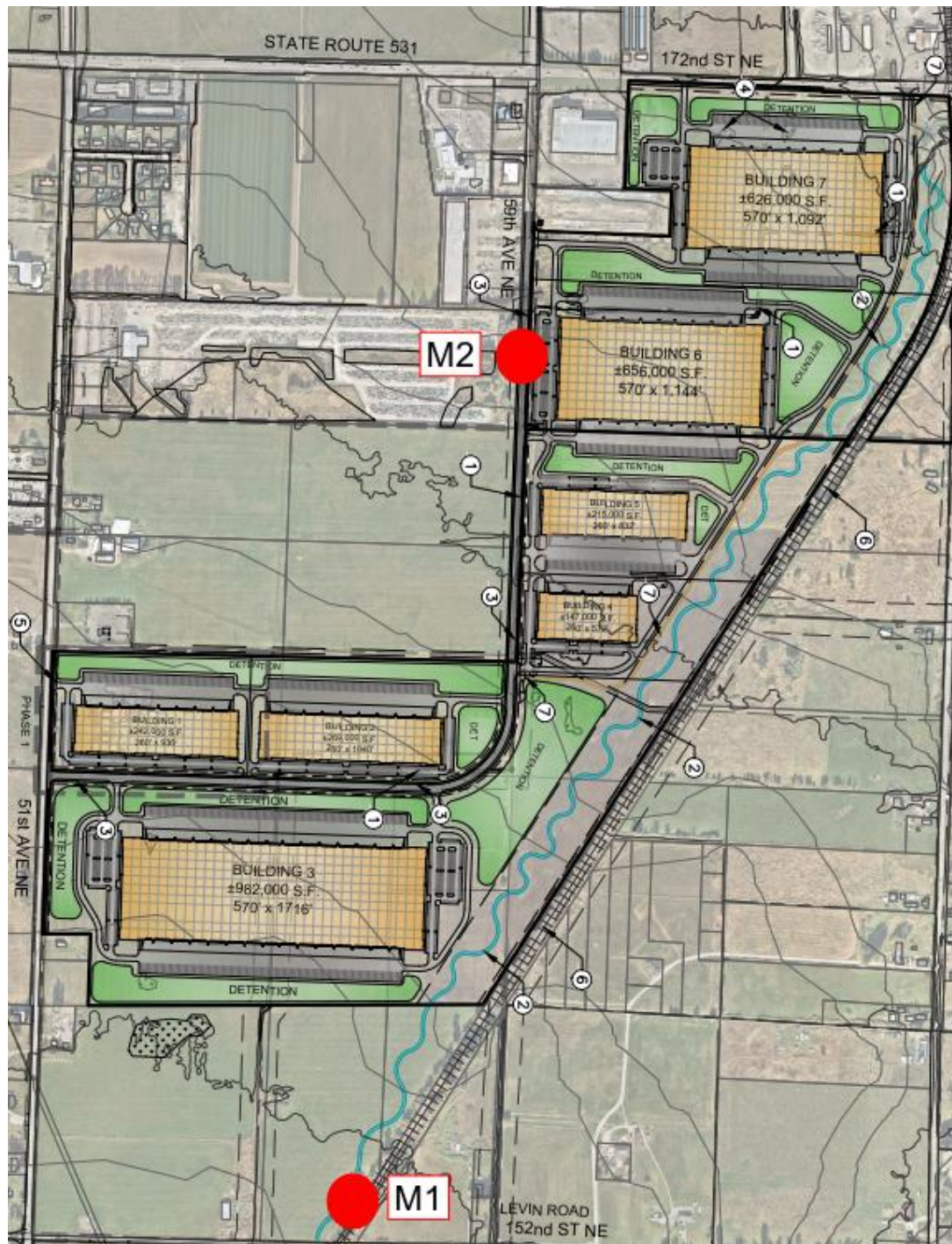
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, L_{eq} . The L_{eq} is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The L_{eq} is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

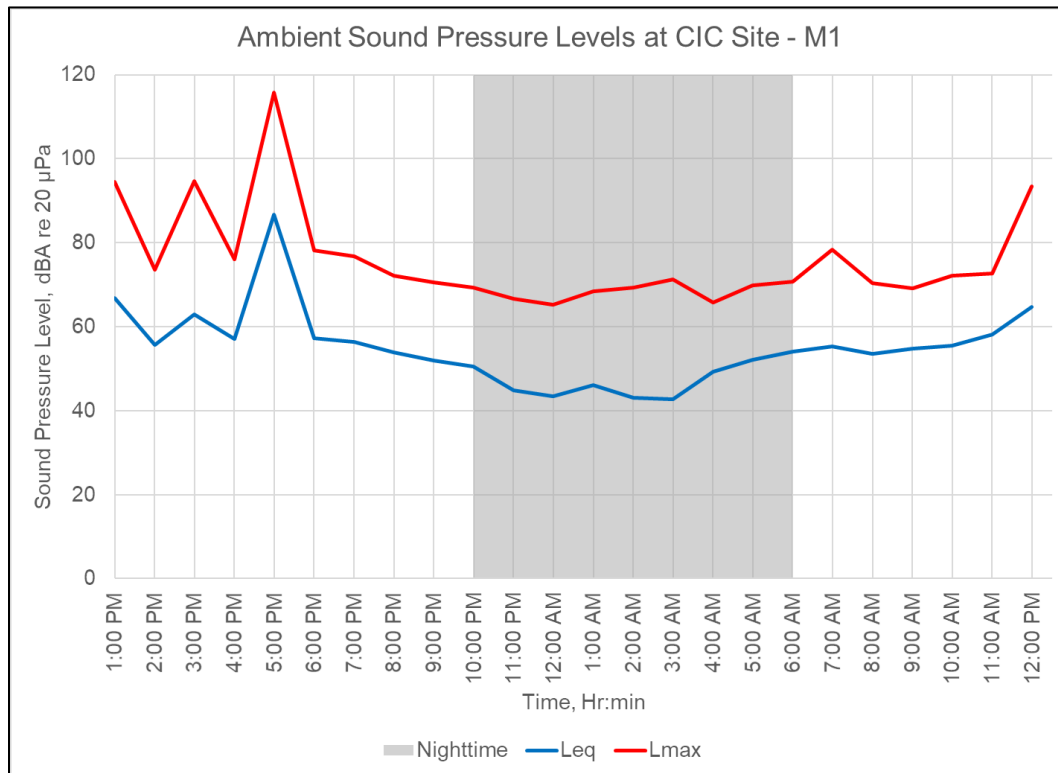


Figure 6: Hourly Noise Levels – Location M1

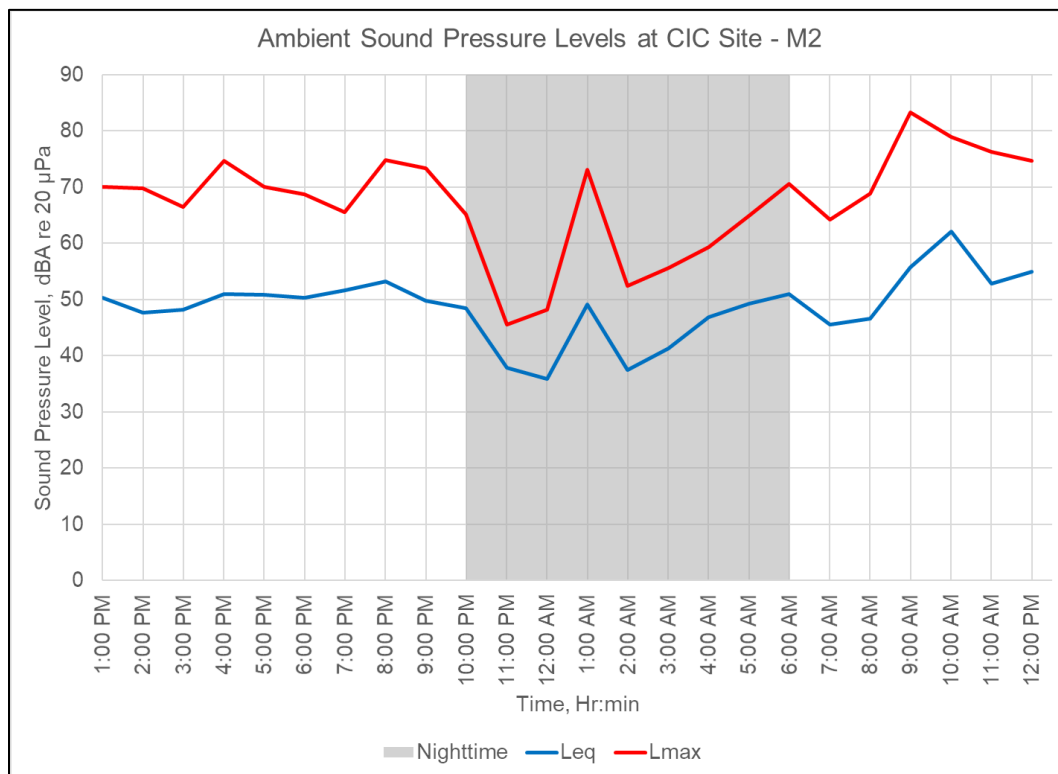


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 2

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 2
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 2 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 2 outlined in red.

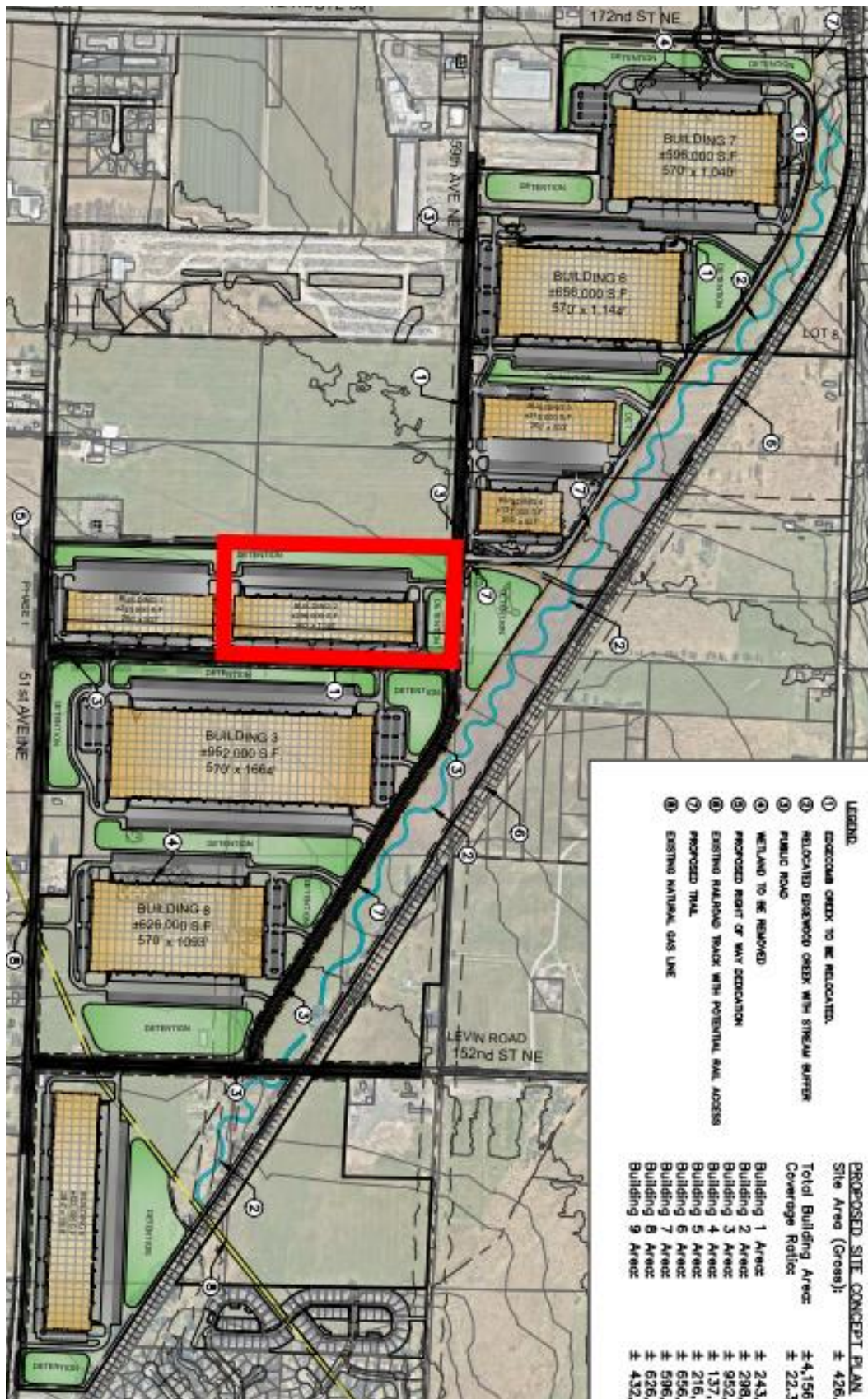


Figure 1: Cascade Industrial Center

II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
North	Marysville	LI	Industrial
South	Marysville	LI	Industrial
West	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

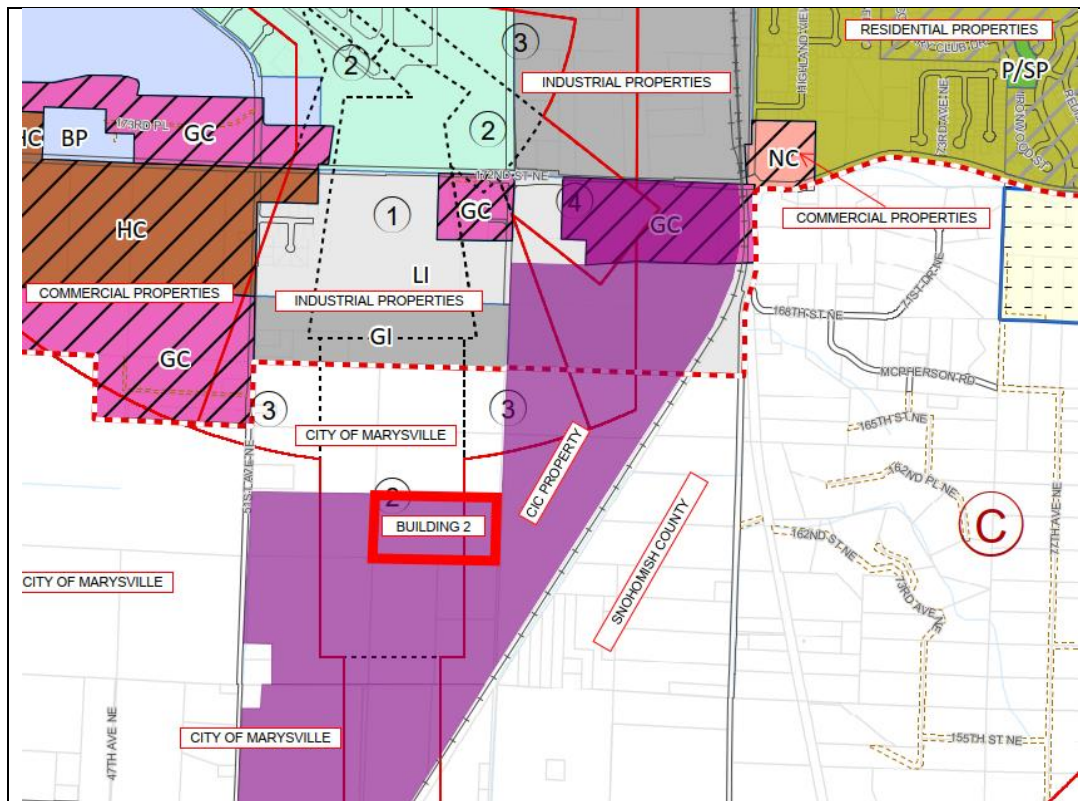


Figure 2: Site and Surrounding Properties – City of Arlington



III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours only, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15 minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Existing Ambient Noise Levels

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site includes one building which will be used for warehousing.
- Locations of operations:
 - The truck entrance to site is on the north side from 51st Ave NE and the proposed public road.
 - The building has one loading dock on the north side of the building with 69 truck bays.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the south and east sides of the building.
- Operations in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	N Loading Dock	4,900
		Truck Maneuvering	4,900
Northwest	Class B	N Loading Dock	1,600
		Truck Maneuvering	1,500
North	Class B	N Loading Dock	2,900
		Truck Maneuvering	2,900
Northeast	Class B	N Loading Dock	4,600
		Truck Maneuvering	4,500

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	N Loading Dock	3,400
		Truck Maneuvering	3,400
South	Class A	N Loading Dock	4,500
		Truck Maneuvering	4,500
North	Class C	N Loading Dock	250
		Truck Maneuvering	150
South	Class C	N Loading Dock	1,800
		Truck Maneuvering	1,850
West	Class C	N Loading Dock	1,300
		Truck Maneuvering	1,200

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	N Loading Dock	1,100
		Truck Maneuvering	1,100

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the average weekday traffic volume generated at building 2 will be 119 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 18 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	18

There are estimated to be a maximum of 18 trucks travelling to/from the loading docks of building 2 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

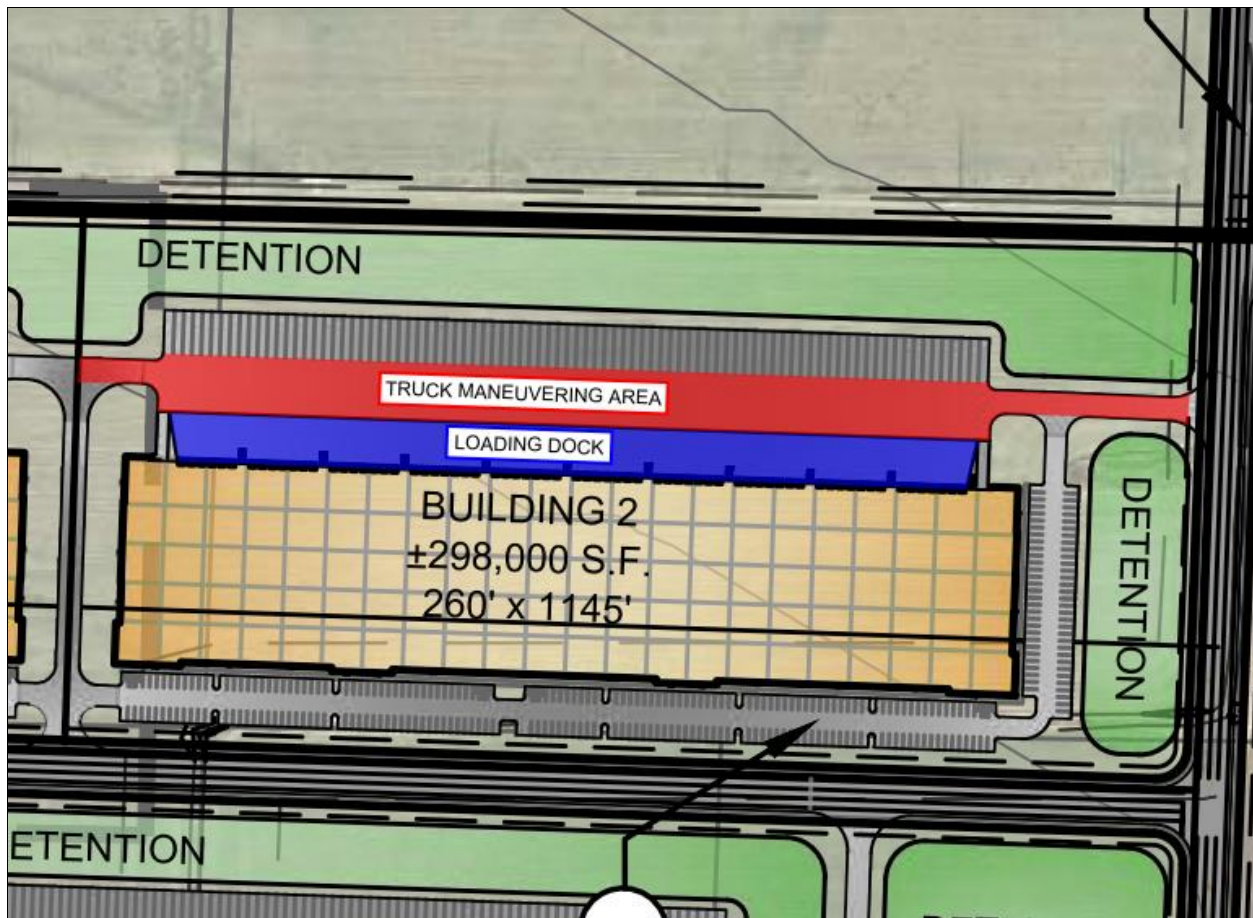


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit	75 dBA at 25 feet
Heavy truck idling	72 dBA at 25 feet
Truck engine starting	74 dBA at 25 feet
Roller door opening/closing	65 dBA at 25 feet
Air brakes	65 – 75 dBA at 25 feet
Pallet being dragged and dropped	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc.	60 dBA at 25 feet

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 30 seconds. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the northwest, north, and northeast; and the nearest Class C EDNA properties to the north, south, and west. The building will effectively block noise associated with the loading docks to the south and southwest receiving properties.

Predicted Noise Levels – Truck Transit

The following are the predicted noise levels from the truck transit events to each of the receiving properties. Predicted levels are compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	4,900 ft	-46	0	29	30	44	18	21
SW	75	25 ft	3,400 ft	-43	-10	22	30	37	18	14
South	75	25 ft	4,500 ft	-45	-10	20	30	35	18	12
East	75	25 ft	1,100 ft	-33	-0	42	30	57	18	34

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NW	75	25 ft	1,500 ft	-36	-0	39	30	54	18	31
North	75	25 ft	2,900 ft	-41	-0	34	30	48	18	25
NE	75	25 ft	4,500 ft	-45	-0	30	30	45	18	22

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	250 ft	-16	-0	55	30	70	18	47
South	75	25 ft	1,800 ft	-37	-10	28	30	42	18	19
West	75	25 ft	1,200 ft	-34	0	41	30	56	18	33

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following are the predicted noise levels from truck idling events to each of the receiving properties. Predicted levels are compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	4,900 ft	-46	-0	26
SW Class A	72	25 ft	3,400 ft	-43	-13	16
South Class A	72	25 ft	4,500 ft	-45	-13	14
East Class A	72	25 ft	1,200 ft	-34	-0	38

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	72	25 ft	1,600 ft	-36	-0	36
North Class B	72	25 ft	2,900 ft	-41	-0	31
NE Class B	72	25 ft	4,600 ft	-45	-0	27

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	300 ft	-22	-0	50
South Class C	72	25 ft	1,800 ft	-37	-13	22
West Class C	72	25 ft	1,300 ft	-34	-0	38

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following are the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration (no more than a few seconds) and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	4,900 ft	-46	-0	28
SW Class A	74	25 ft	3,400 ft	-43	-13	18
South Class A	74	25 ft	4,500 ft	-45	-13	16
East Class A	74	25 ft	1,200 ft	-34	-0	40

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	74	25 ft	1,600 ft	-36	-0	38
North Class B	74	25 ft	2,900 ft	-41	-0	33
NE Class B	74	25 ft	4,600 ft	-45	-0	29

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	300 ft	-22	-0	52
South Class C	74	25 ft	1,800 ft	-37	-13	24
West Class C	74	25 ft	1,300 ft	-34	-0	40

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following are the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration (no more than a few seconds) and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	4,900 ft	-46	-0	29
SW Class A	75	25 ft	3,400 ft	-43	-13	19
South Class A	75	25 ft	4,500 ft	-45	-13	17
East Class A	75	25 ft	1,200 ft	-34	-0	41

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	75	25 ft	1,600 ft	-36	-0	39
North Class B	75	25 ft	2,900 ft	-41	-0	34
NE Class B	75	25 ft	4,600 ft	-45	-0	30

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	300 ft	-22	-0	53
South Class C	75	25 ft	1,800 ft	-37	-13	25
West Class C	75	25 ft	1,300 ft	-34	-0	41

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

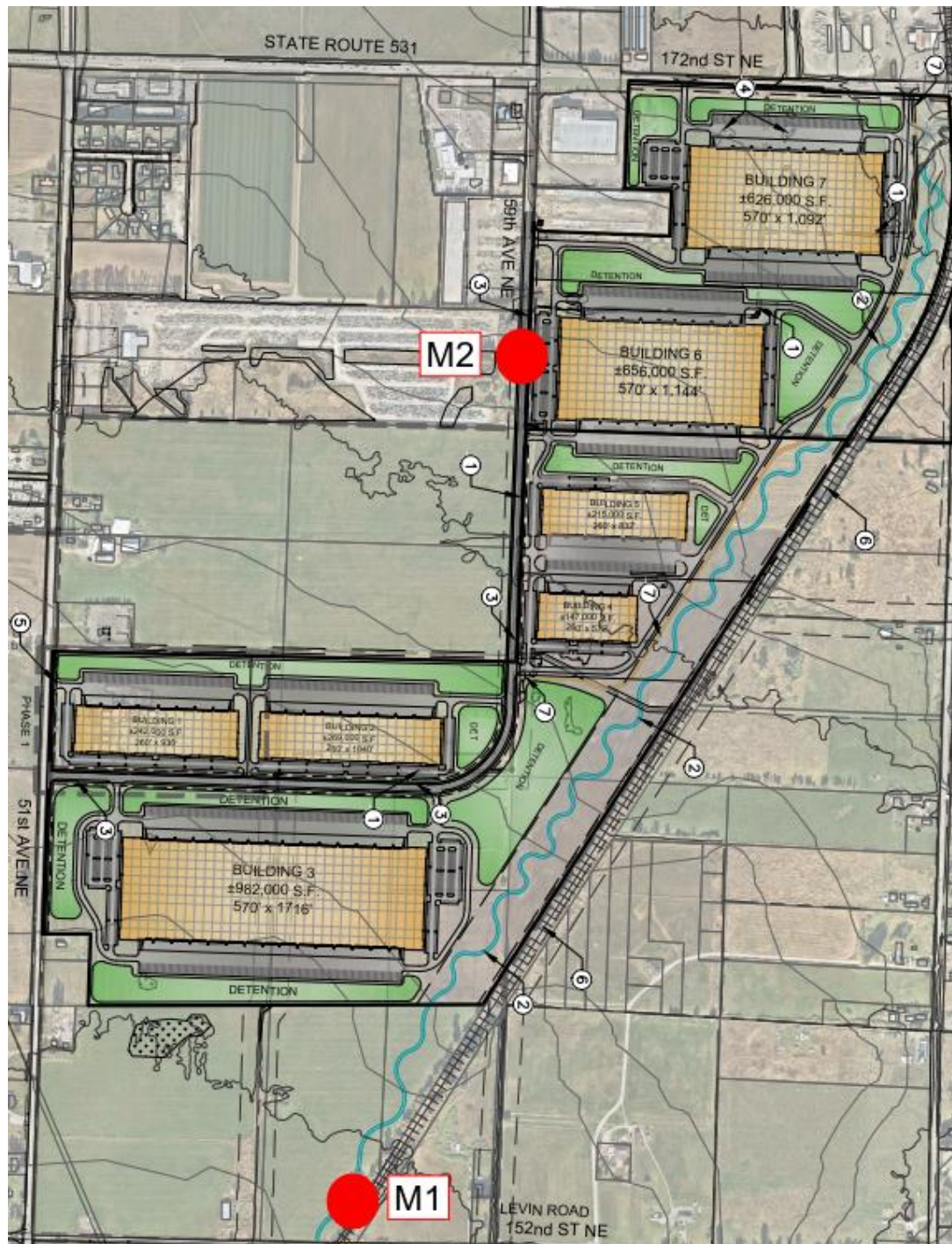
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, L_{eq} . The L_{eq} is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The L_{eq} is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

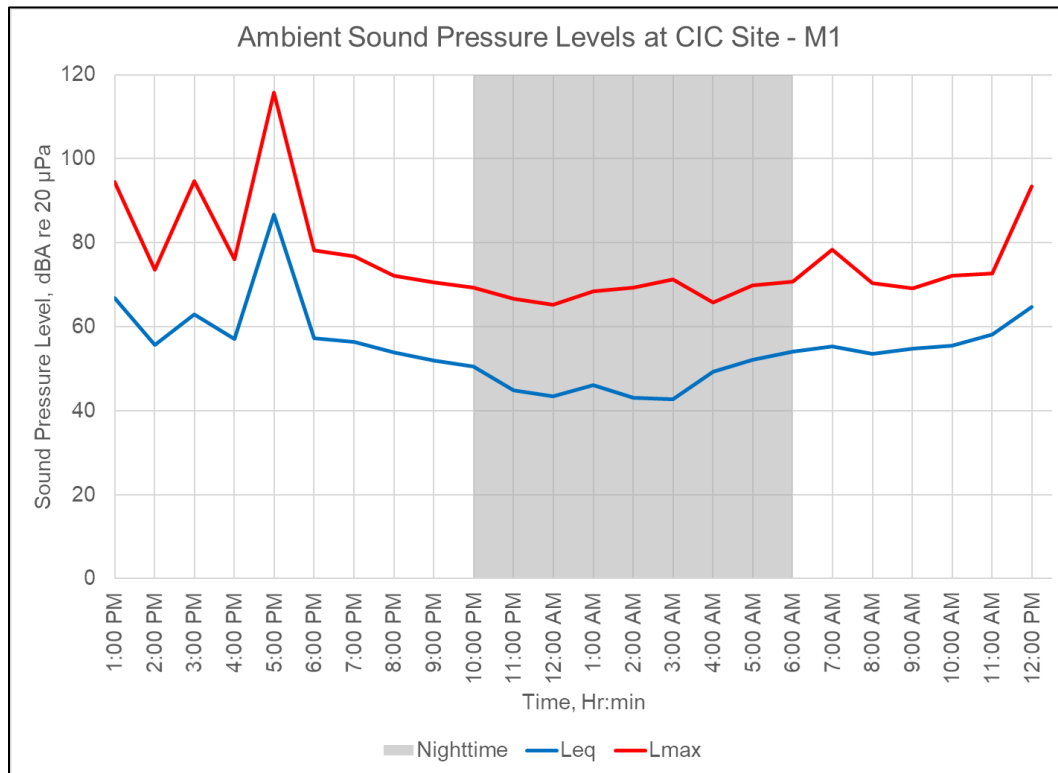


Figure 6: Hourly Noise Levels – Location M1

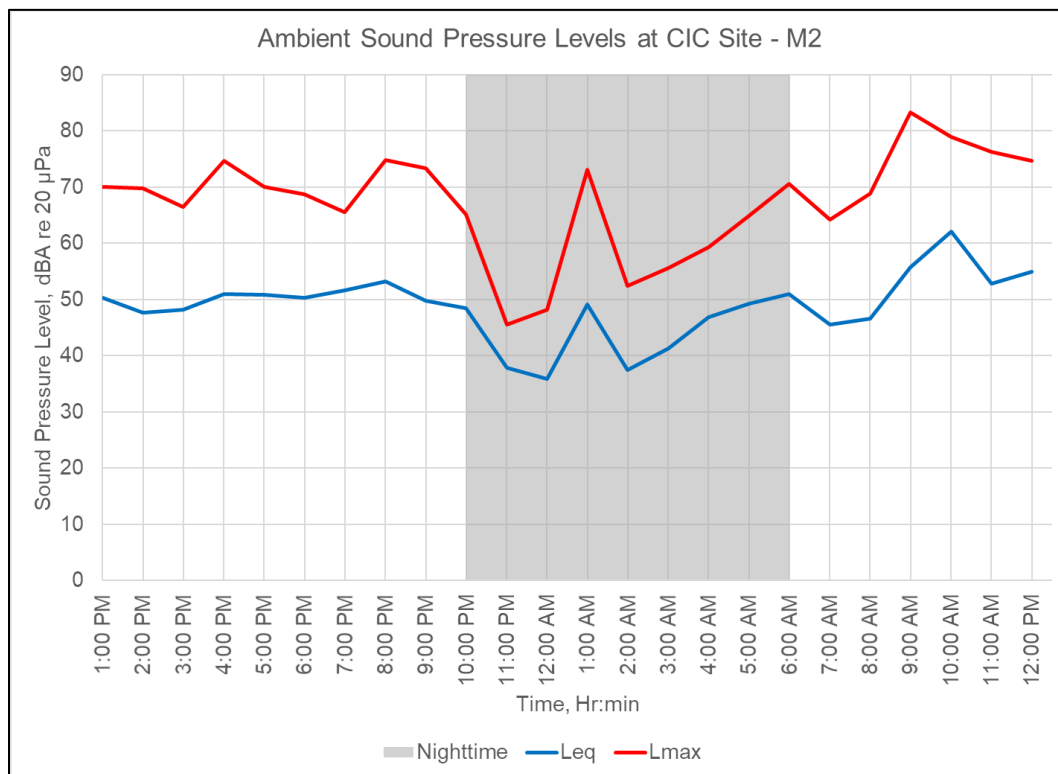


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 3

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 3
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 3 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 3 outlined in red.

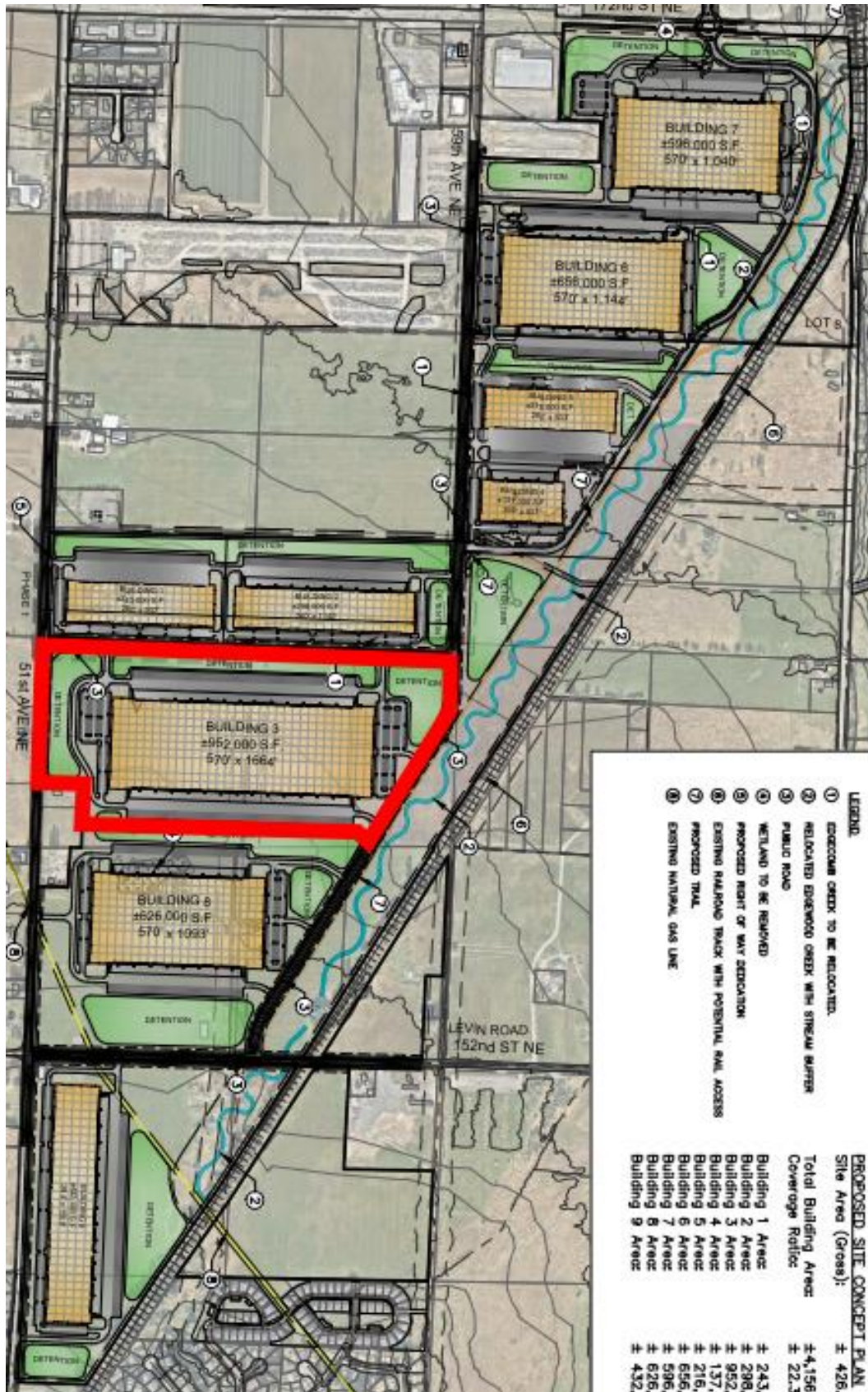


Figure 1: Cascade Industrial Center

II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
North	Marysville	LI	Industrial
South	Marysville	LI	Industrial
West	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

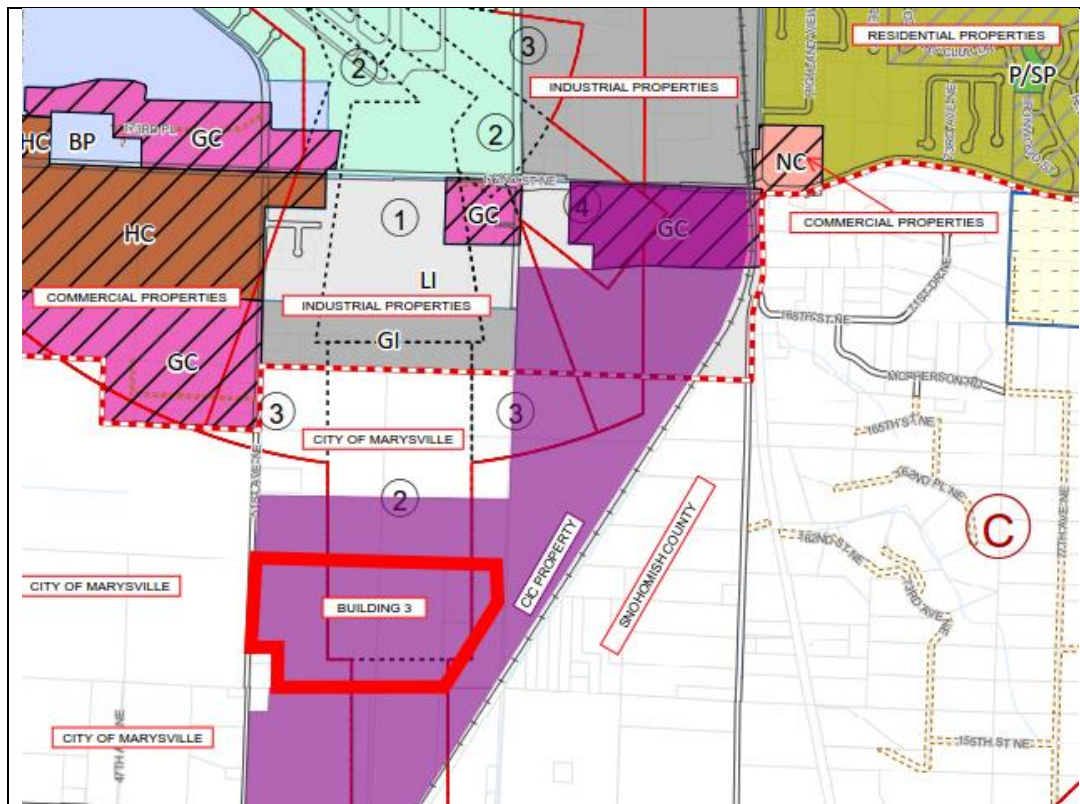


Figure 2: Site and Surrounding Properties – City of Arlington

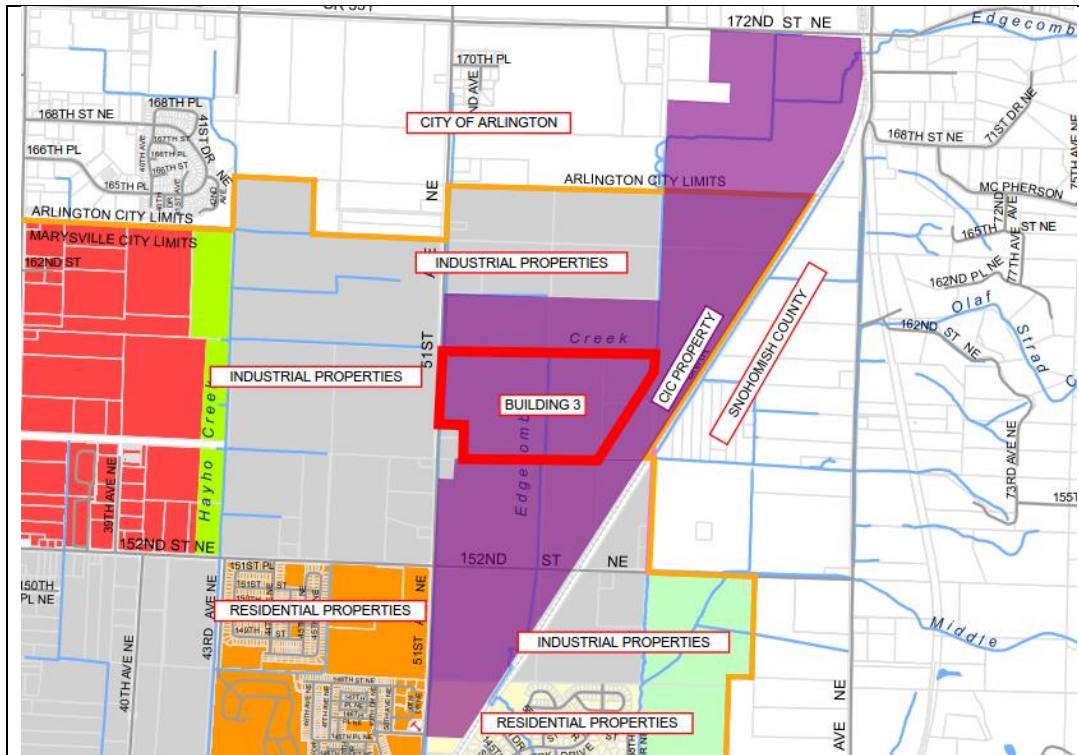


Figure 3: Site and Surrounding Properties – City of Marysville

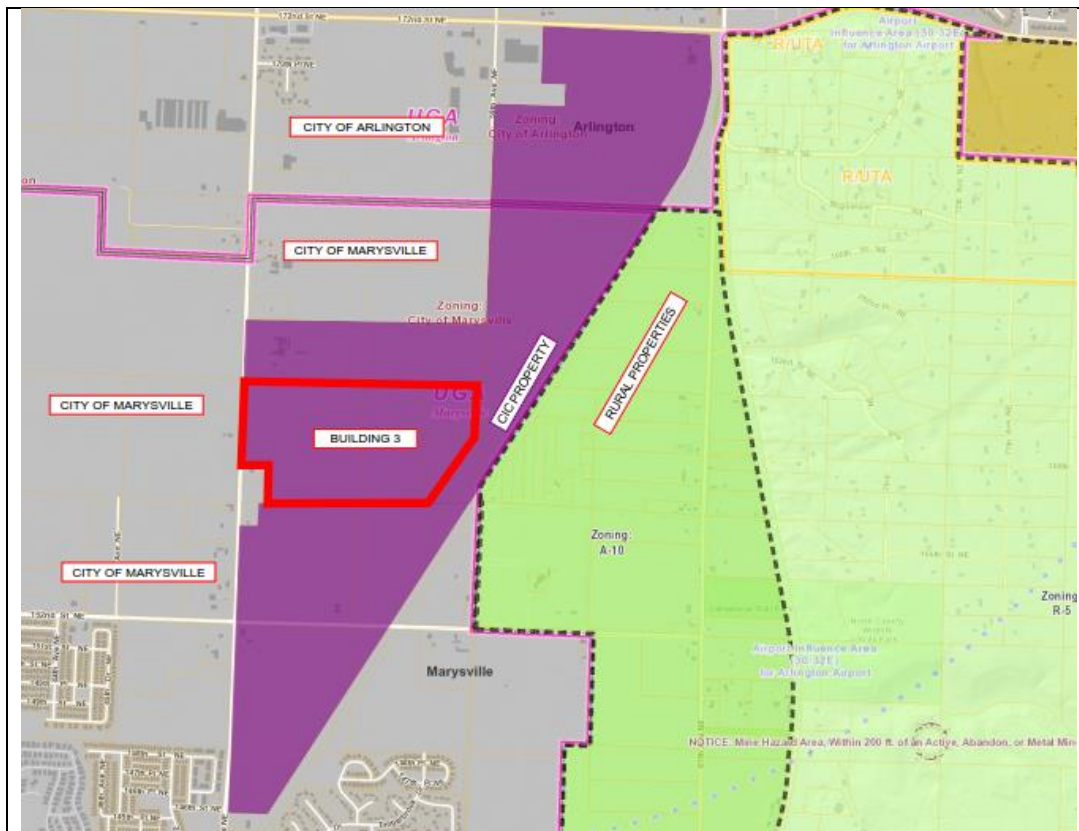


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15-minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to site is on the north side from the public road or from the southeast from the proposed public road.
 - The building has two loading docks, one on the north side and one on the side of the building with 94 truck bays each.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the east and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	N Loading Dock	5,500
		Truck Maneuvering	5,500
Northwest	Class B	N Loading Dock	1,800
		Truck Maneuvering	1,500
North	Class B	N Loading Dock	3,700
		Truck Maneuvering	3,500
Northeast	Class B	N Loading Dock	5,400
		Truck Maneuvering	5,100

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	S Loading Dock	1,800
		Truck Maneuvering	1,700
South	Class A	S Loading Dock	3,000
		Truck Maneuvering	3,000
North	Class C	N Loading Dock	1,000
		Truck Maneuvering	900
South	Class C	S Loading Dock	750
		Truck Maneuvering	750
West	Class C	N Loading Dock	1,300
		Truck Maneuvering	1,150

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	S Loading Dock	1,000
		Truck Maneuvering	550

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the PM peak hourly traffic volume generated at building 3 will be 562 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 84 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	84

There are estimated to be a maximum of 84 trucks travelling to/from the loading docks of building 3 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

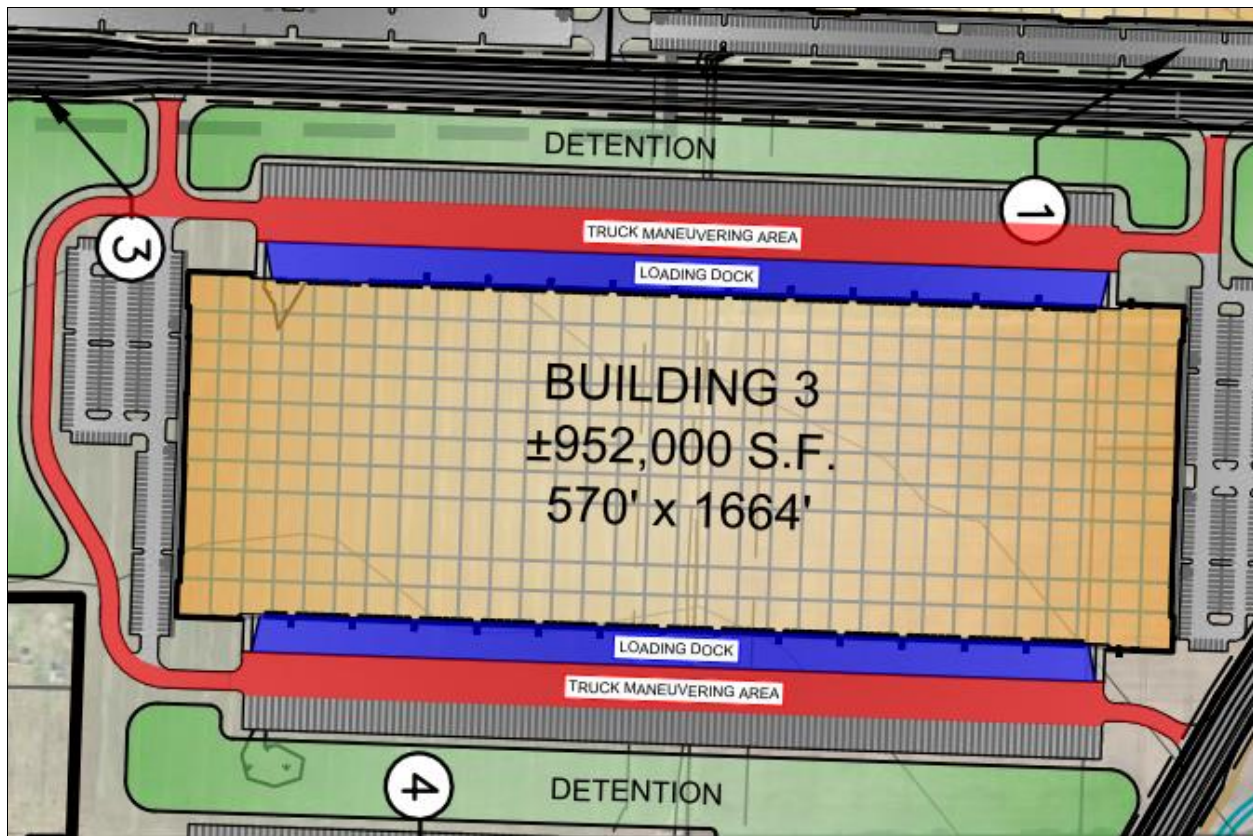


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit ¹	75 dBA at 25 feet
Heavy truck idling ¹	72 dBA at 25 feet
Truck engines starting noises ¹	74 dBA at 25 feet
Roller door opening/closing ²	65 dBA at 25 feet
Air brakes ²	65 – 75 dBA at 25 feet
Pallet being dragged and dropped ²	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. ²	60 dBA at 25 feet

1. These events occur for approximately 1 minute.

2. These events occur for short durations, a few seconds or less in duration.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 1 minute. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the northwest, north, and northeast; and the nearest Class C EDNA properties to the north, south, and west.

Predicted Noise Levels – Truck Transit

The following section presents the predicted noise levels from the truck transit events to each of the receiving properties and compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	5,500 ft	-47	-0	28	30	43	84	27
SW	75	25 ft	1,700 ft	-37	-0	38	30	53	84	37
South	75	25 ft	3,000 ft	-42	-0	33	30	48	84	32
East	75	25 ft	525 ft	-26	-0	49	30	63	84	47

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NW	75	25 ft	1,500 ft	-36	-0	39	30	54	84	38
North	75	25 ft	3,500 ft	-43	-0	32	30	47	84	31
NE	75	25 ft	5,100 ft	-46	-0	29	30	44	84	27

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	850 ft	-31	-0	44	30	59	84	43
South	75	25 ft	550 ft	-27	-0	48	30	63	84	47
West	75	25 ft	250 ft	-20	0	55	30	70	84	53

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following sections present the predicted noise levels from truck idling events to each of the receiving properties with the proposed mitigation. Trucks idling are predicted for a truck idling at the loading dock nearest the receiving property and compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	5,500 ft	-47	-0	25
SW Class A	72	25 ft	1,800 ft	-37	-0	35
South Class A	72	25 ft	3,000 ft	-42	-0	30
East Class A	72	25 ft	725 ft	-29	-0	43

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	72	25 ft	1,800 ft	-37	-0	35
North Class B	72	25 ft	3,700 ft	-43	-0	29
NE Class B	72	25 ft	5,400 ft	-47	-0	25

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	1,000 ft	-32	-0	40
South Class C	72	25 ft	750 ft	-30	-0	42
West Class C	72	25 ft	650 ft	-28	-0	44

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following sections present the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	5,500 ft	-47	-0	27
SW Class A	74	25 ft	1,800 ft	-37	-0	37
South Class A	74	25 ft	3,000 ft	-42	-0	32
East Class A	74	25 ft	725 ft	-29	-0	45

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	74	25 ft	1,800 ft	-37	-0	37
North Class B	74	25 ft	3,700 ft	-43	-0	31
NE Class B	74	25 ft	5,400 ft	-47	-0	27

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	1,000 ft	-32	-0	42
South Class C	74	25 ft	750 ft	-30	-0	44
West Class C	74	25 ft	650 ft	-28	-0	46

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following sections present the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	5,500 ft	-47	-0	28
SW Class A	75	25 ft	1,800 ft	-37	-0	38
South Class A	75	25 ft	3,000 ft	-42	-0	33
East Class A	75	25 ft	725 ft	-29	-0	46

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	75	25 ft	1,800 ft	-37	-0	38
North Class B	75	25 ft	3,700 ft	-43	-0	32
NE Class B	75	25 ft	5,400 ft	-47	-0	28

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	1,000 ft	-32	-0	43
South Class C	75	25 ft	750 ft	-30	-0	45
West Class C	75	25 ft	650 ft	-28	-0	47

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

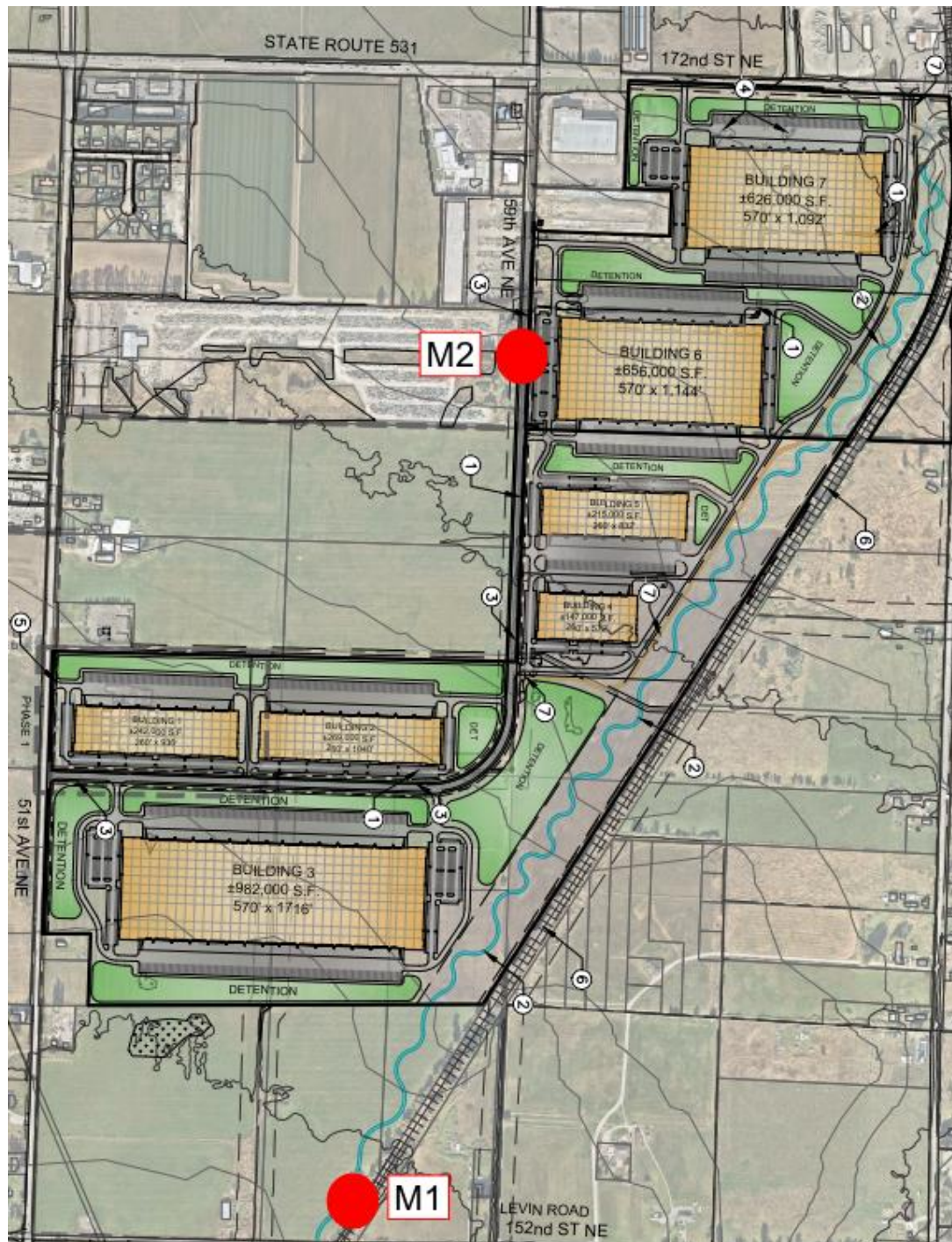
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, Leq . The Leq is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The Leq is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

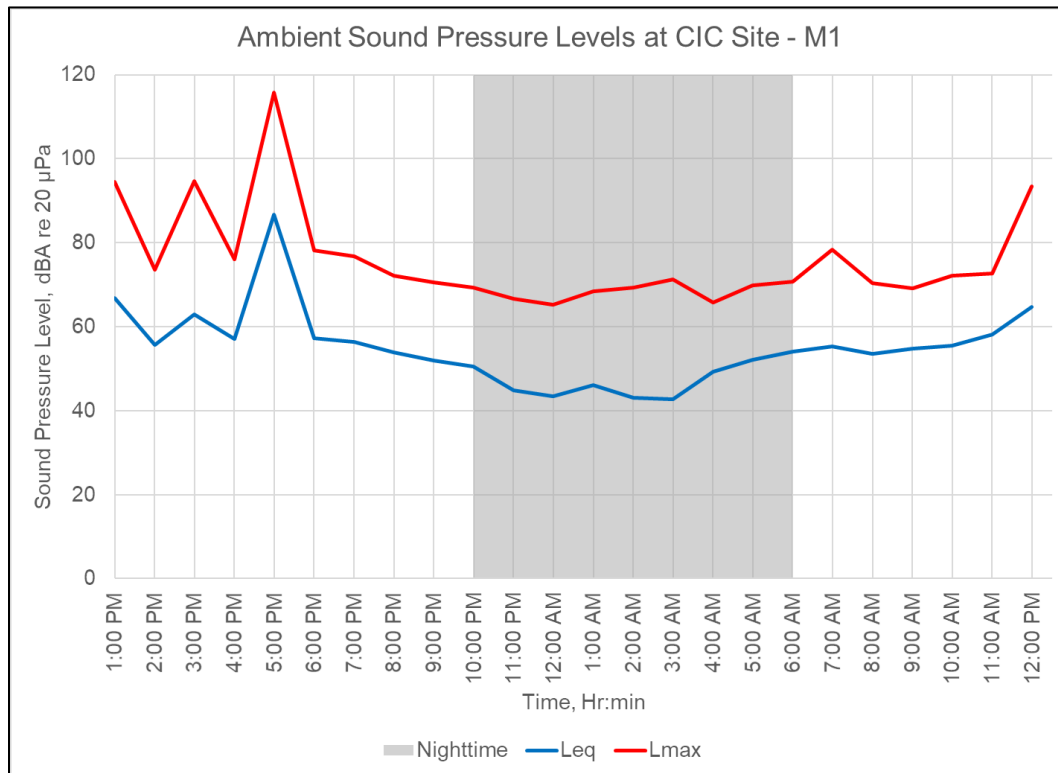


Figure 6: Hourly Noise Levels – Location M1

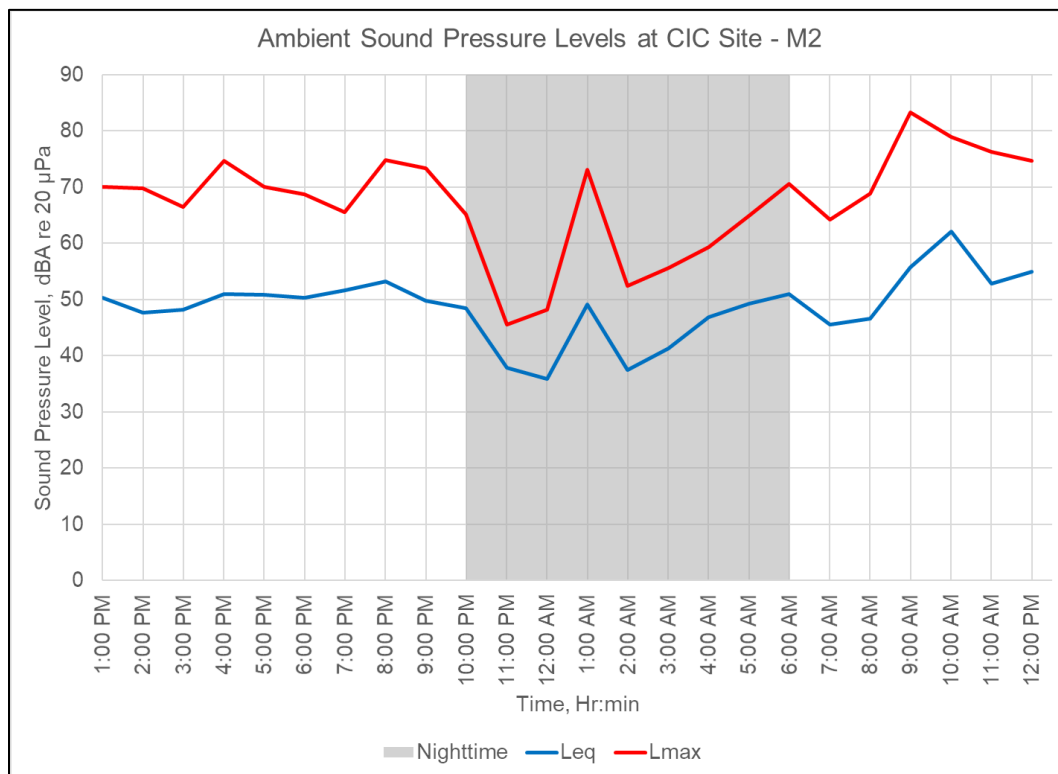


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 4

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 4
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 4 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 4 outlined in red.

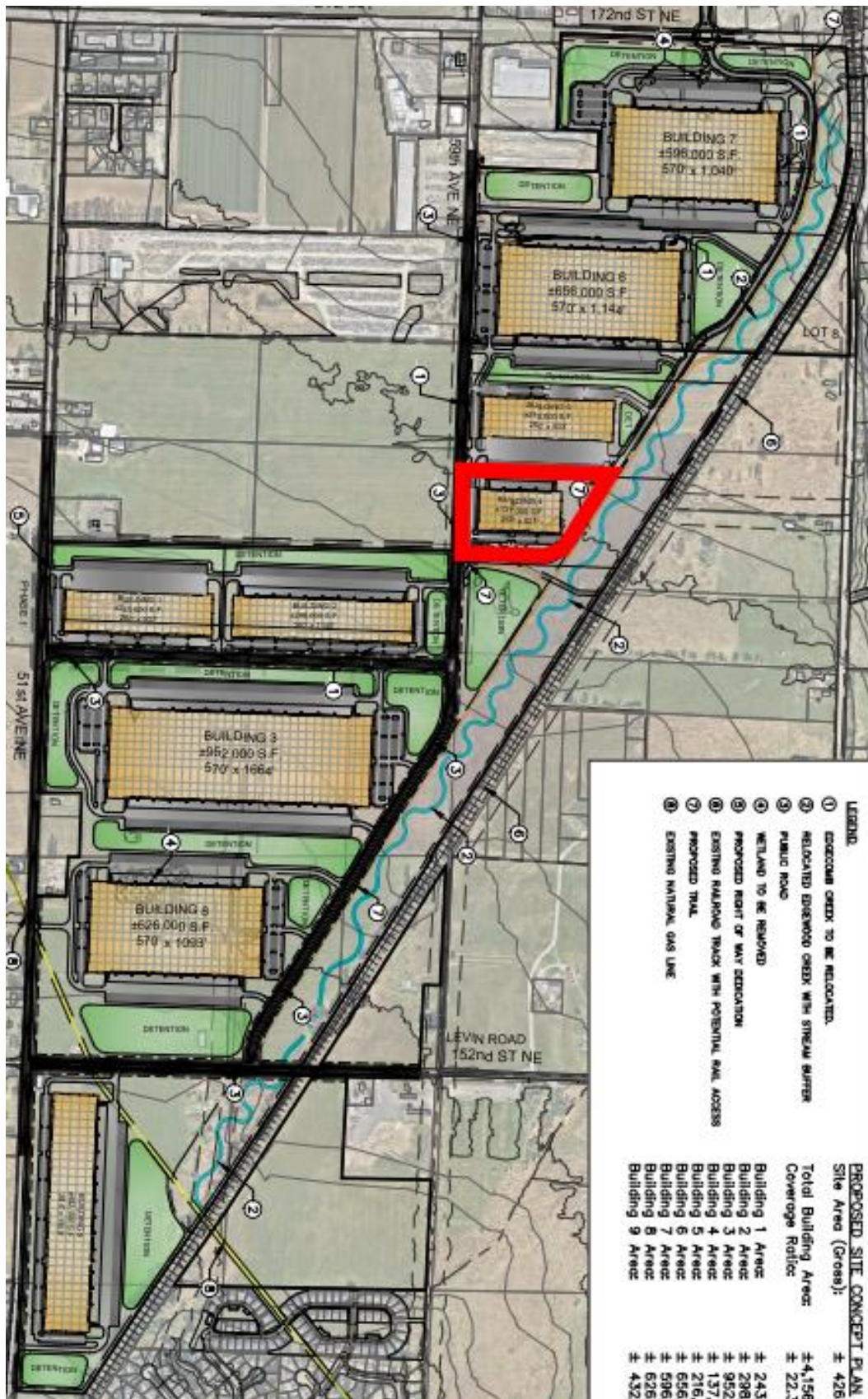


Figure 1: Cascade Industrial Center

II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
NW	Arlington	GI	Industrial
South	Marysville	LI	Industrial
West	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

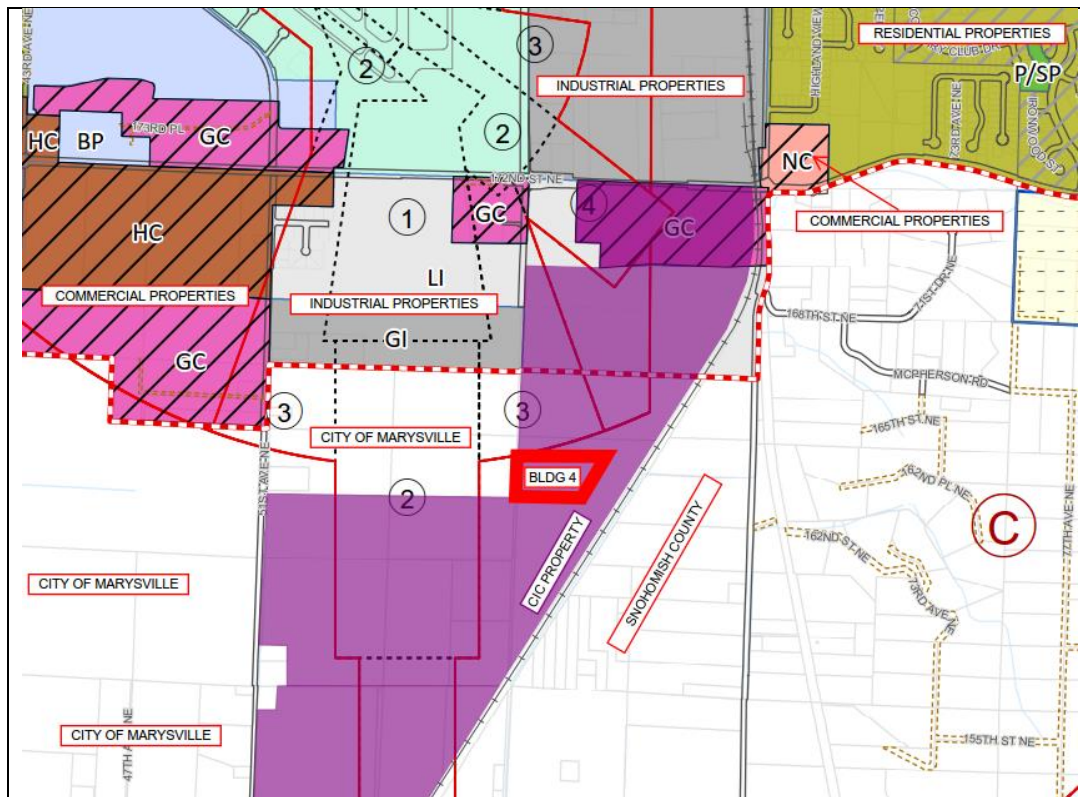


Figure 2: Site and Surrounding Properties – City of Arlington

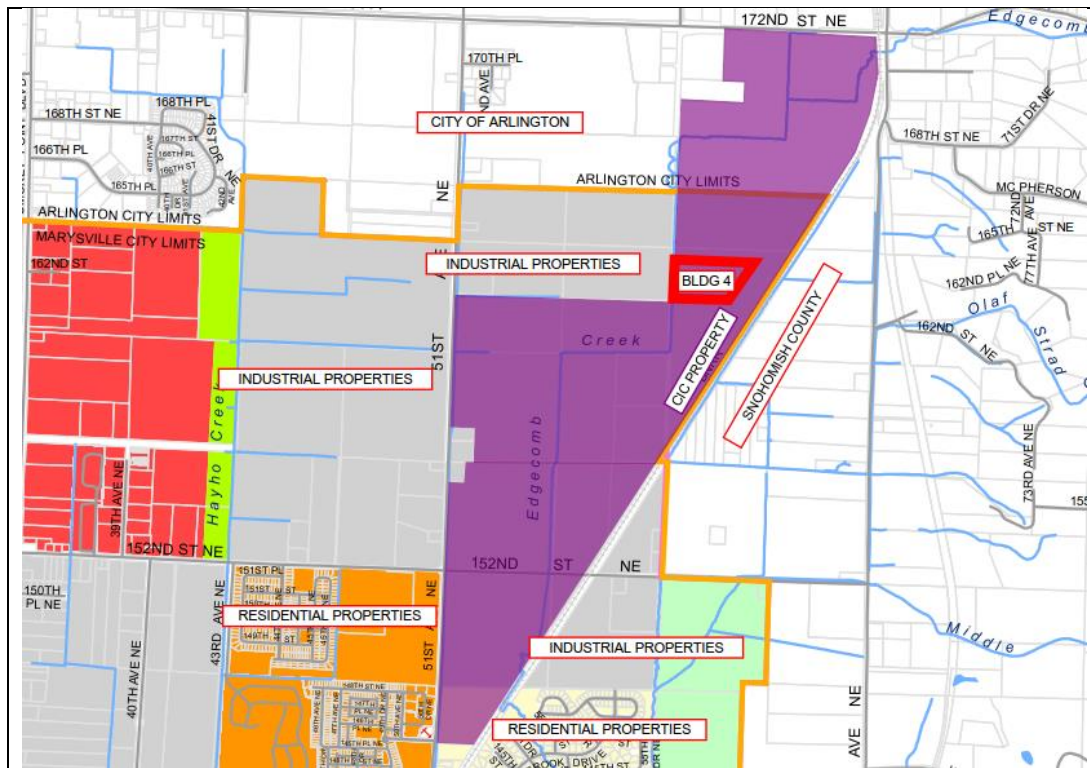


Figure 3: Site and Surrounding Properties – City of Marysville

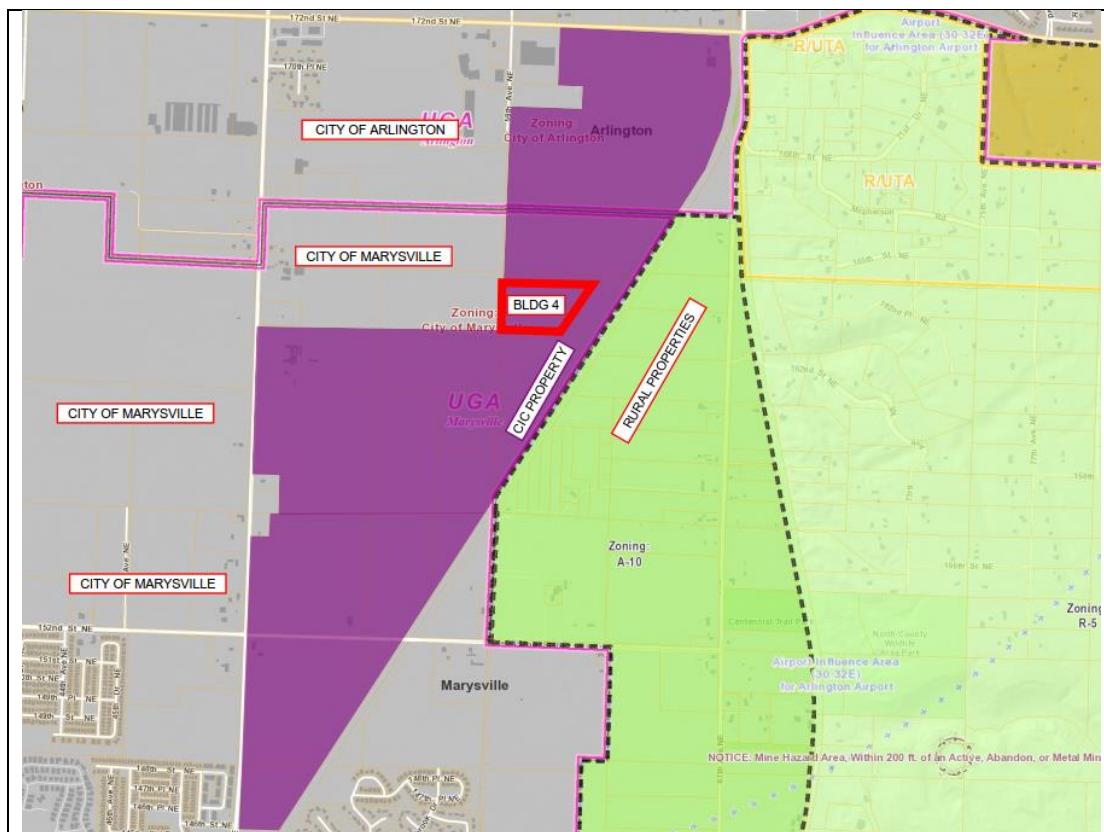


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15-minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to site is on the north side from the public road or from the east from the proposed public road.
 - The building has one loading dock on the north side of the building with 27 truck bays.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the south and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	N Loading Dock	3,900
		Truck Maneuvering	3,900
Northwest	Class B	N Loading Dock	2,800
		Truck Maneuvering	2,800
North	Class B	N Loading Dock	2,200
		Truck Maneuvering	2,200
Northeast	Class B	N Loading Dock	3,500
		Truck Maneuvering	3,500
Northwest	Class C	N Loading Dock	950
		Truck Maneuvering	850

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	N Loading Dock	4,800
		Truck Maneuvering	4,800
South	Class A	N Loading Dock	5,100
		Truck Maneuvering	5,100
South	Class C	N Loading Dock	2,500
		Truck Maneuvering	2,500
West	Class C	N Loading Dock	125
		Truck Maneuvering	125

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	N Loading Dock	800
		Truck Maneuvering	800

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the PM peak hourly traffic volume generated at building 4 will be 55 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 8 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	8

There are estimated to be a maximum of 8 trucks travelling to/from the loading docks of building 4 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

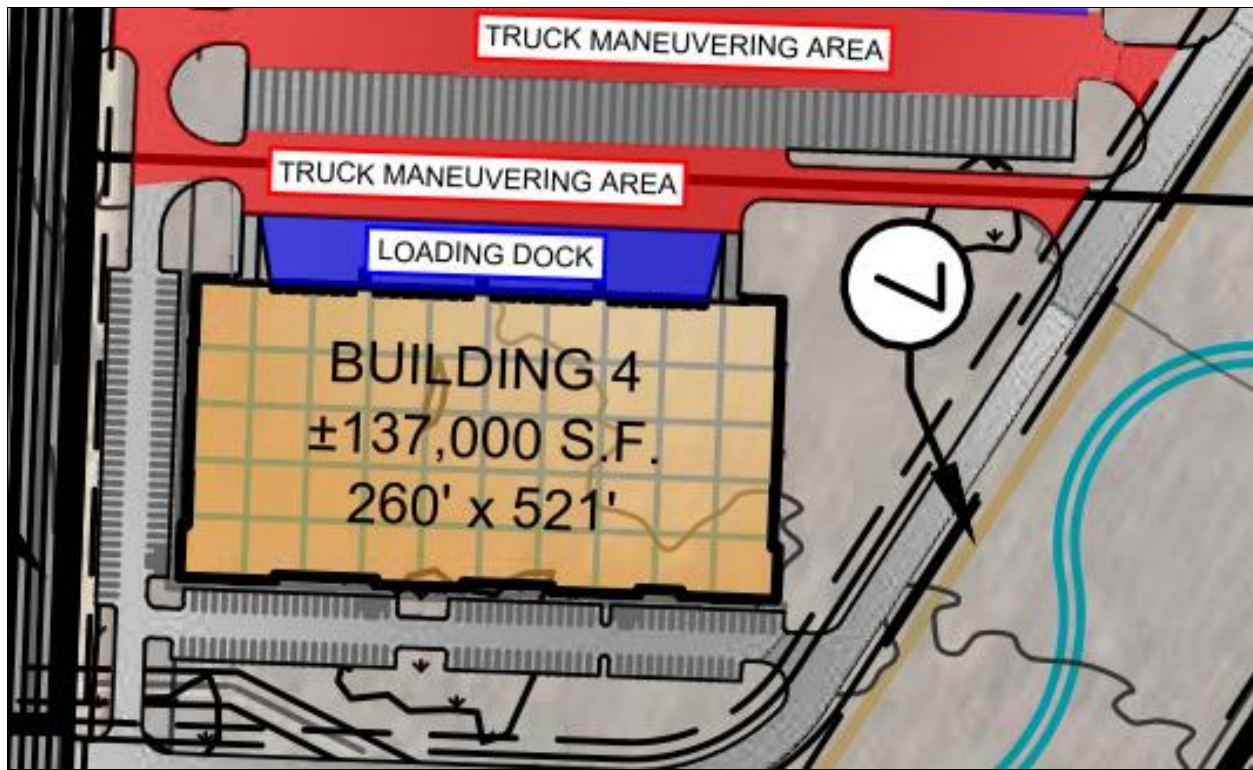


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit ¹	75 dBA at 25 feet
Heavy truck idling ¹	72 dBA at 25 feet
Truck engines starting noises ¹	74 dBA at 25 feet
Roller door opening/closing ²	65 dBA at 25 feet
Air brakes ²	65 – 75 dBA at 25 feet
Pallet being dragged and dropped ²	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. ²	60 dBA at 25 feet

1. These events occur for approximately 1 minute.

2. These events occur for short durations, a few seconds or less in duration.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 1 minute. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the northwest, north, and northeast; and the nearest Class C EDNA properties to the north, south, and west. The building will effectively block noise associated with the loading docks to the south and southwest receiving properties.

Predicted Noise Levels – Truck Transit

The following section presents the predicted noise levels from the truck transit events to each of the receiving properties and compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	3,900 ft	-44	-0	31	30	46	8	19
SW	75	25 ft	4,800 ft	-46	-10	19	30	34	8	7
South	75	25 ft	5,100 ft	-46	-10	19	30	33	8	7
East	75	25 ft	800 ft	-30	-0	45	30	60	8	33

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NW	75	25 ft	2,800 ft	-41	-0	34	30	49	8	22
North	75	25 ft	2,200 ft	-39	-0	36	30	51	8	24
NE	75	25 ft	3,500 ft	-43	-0	32	30	47	8	20

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	2,000 ft	-38	-0	37	30	52	8	25
South	75	25 ft	2,500 ft	-40	-10	25	30	40	8	13
West	75	25 ft	125 ft	-14	0	61	30	76	8	49

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following sections present the predicted noise levels from truck idling events to each of the receiving properties with the proposed mitigation. Trucks idling are predicted for a truck idling at the loading dock nearest the receiving property and compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	3,900 ft	-44	-0	30
SW Class A	72	25 ft	4,800 ft	-46	-13	15
South Class A	72	25 ft	5,100 ft	-46	-13	15
East Class A	72	25 ft	800 ft	-30	-0	44

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	72	25 ft	2,800 ft	-41	-0	31
North Class B	72	25 ft	2,200 ft	-39	-0	33
NE Class B	72	25 ft	3,500 ft	-43	-0	29

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	2,000 ft	-38	-0	34
South Class C	72	25 ft	2,350 ft	-40	-13	19
West Class C	72	25 ft	275 ft	-21	-0	51

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following sections present the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	3,900 ft	-44	-0	30
SW Class A	74	25 ft	4,800 ft	-46	-13	15
South Class A	74	25 ft	5,100 ft	-46	-13	15
East Class A	74	25 ft	800 ft	-30	-0	44

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	74	25 ft	2,800 ft	-41	-0	33
North Class B	74	25 ft	2,200 ft	-39	-0	35
NE Class B	74	25 ft	3,500 ft	-43	-0	31

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	2,000 ft	-38	-0	36
South Class C	74	25 ft	2,350 ft	-40	-13	21
West Class C	74	25 ft	275 ft	-21	-0	53

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following sections present the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	3,900 ft	-44	-0	31
SW Class A	75	25 ft	4,800 ft	-46	-13	16
South Class A	75	25 ft	5,100 ft	-46	-13	16
East Class A	75	25 ft	800 ft	-30	-0	45

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	75	25 ft	2,800 ft	-41	-0	34
North Class B	75	25 ft	2,200 ft	-39	-0	36
NE Class B	75	25 ft	3,500 ft	-43	-0	32

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	2,000 ft	-38	-0	37
South Class C	75	25 ft	2,350 ft	-40	-13	22
West Class C	75	25 ft	275 ft	-21	-0	54

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

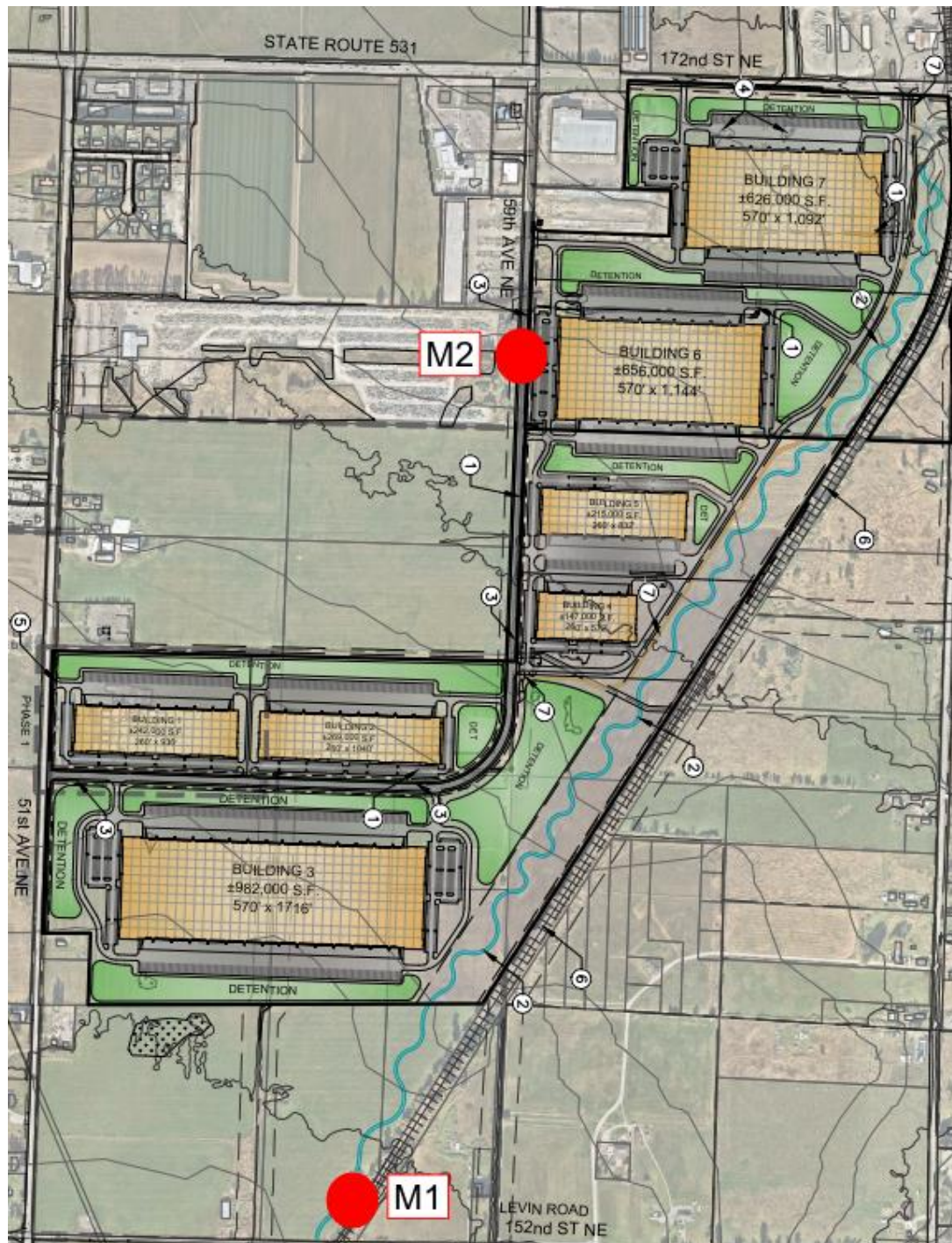
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, Leq . The Leq is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The Leq is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

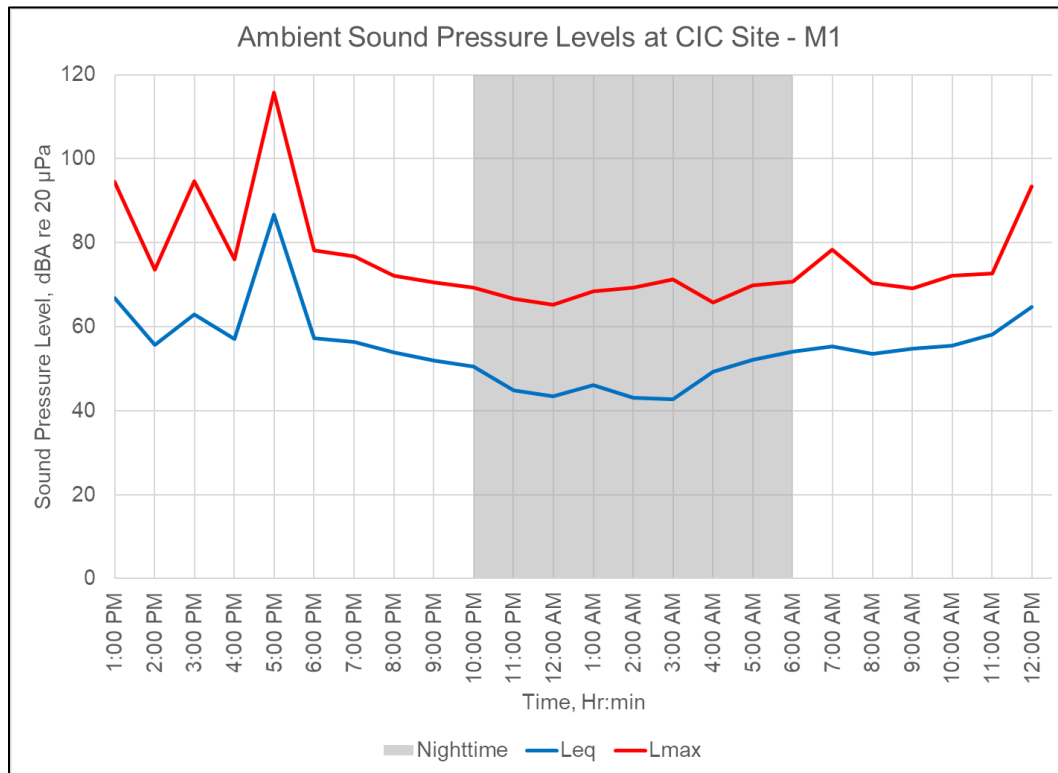


Figure 6: Hourly Noise Levels – Location M1

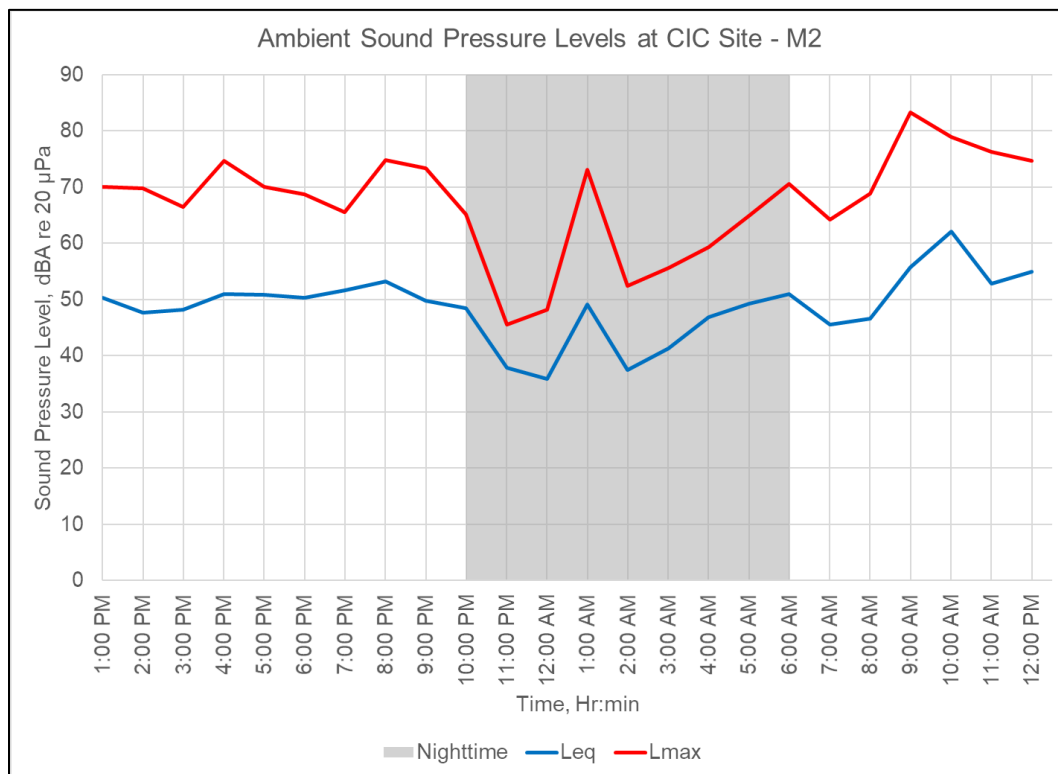


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 5

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 5
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

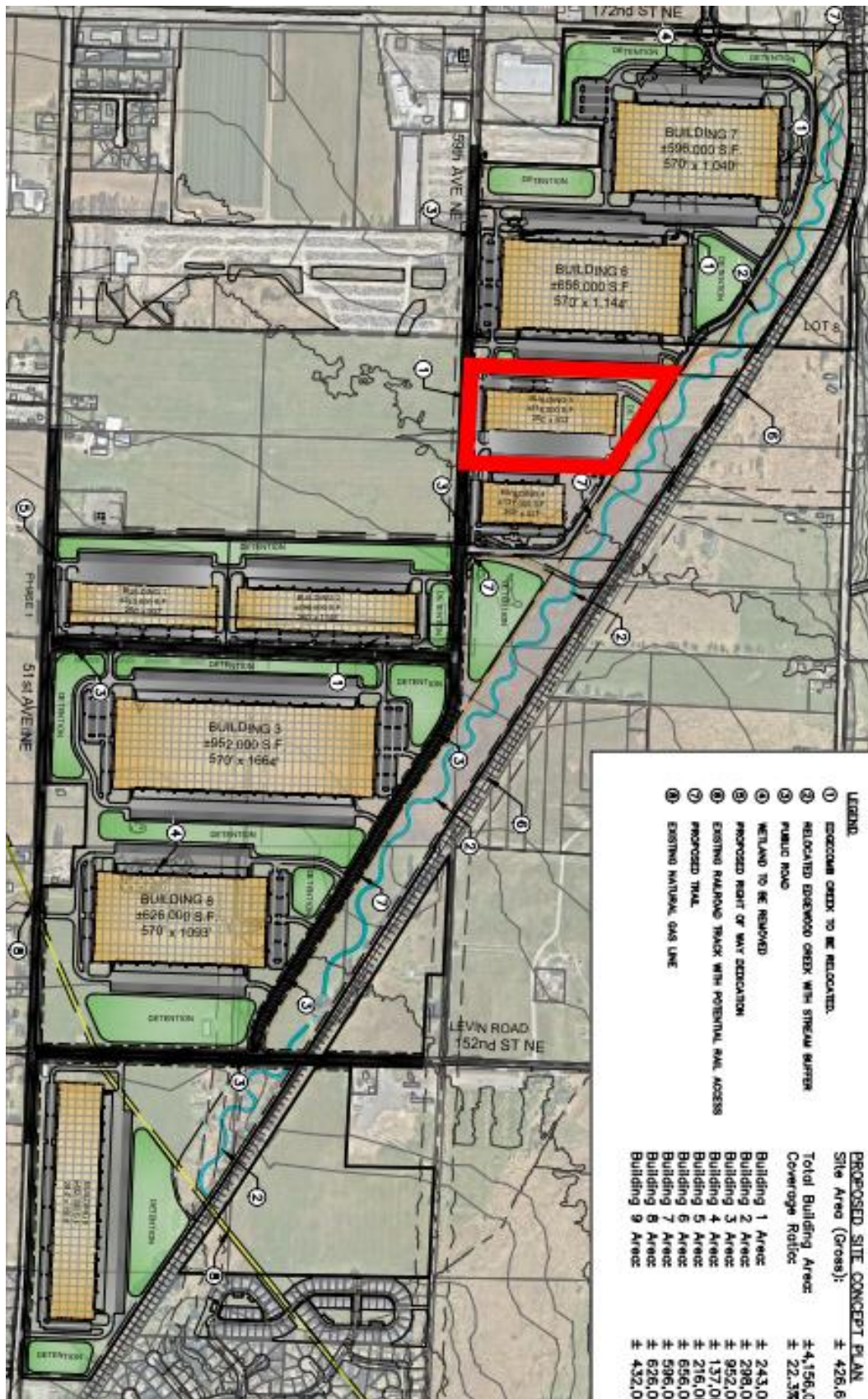
I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 5 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 5 outlined in red.



II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
North	Arlington	LI	Industrial
South	Marysville	LI	Industrial
West	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

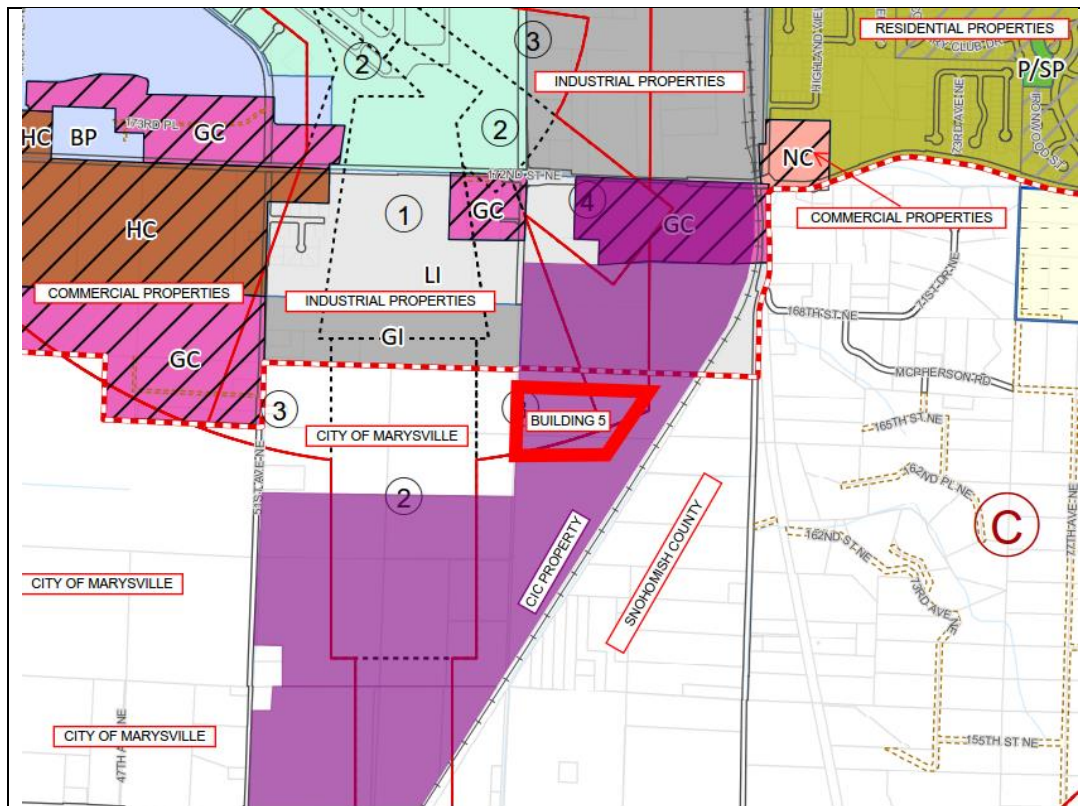


Figure 2: Site and Surrounding Properties – City of Arlington

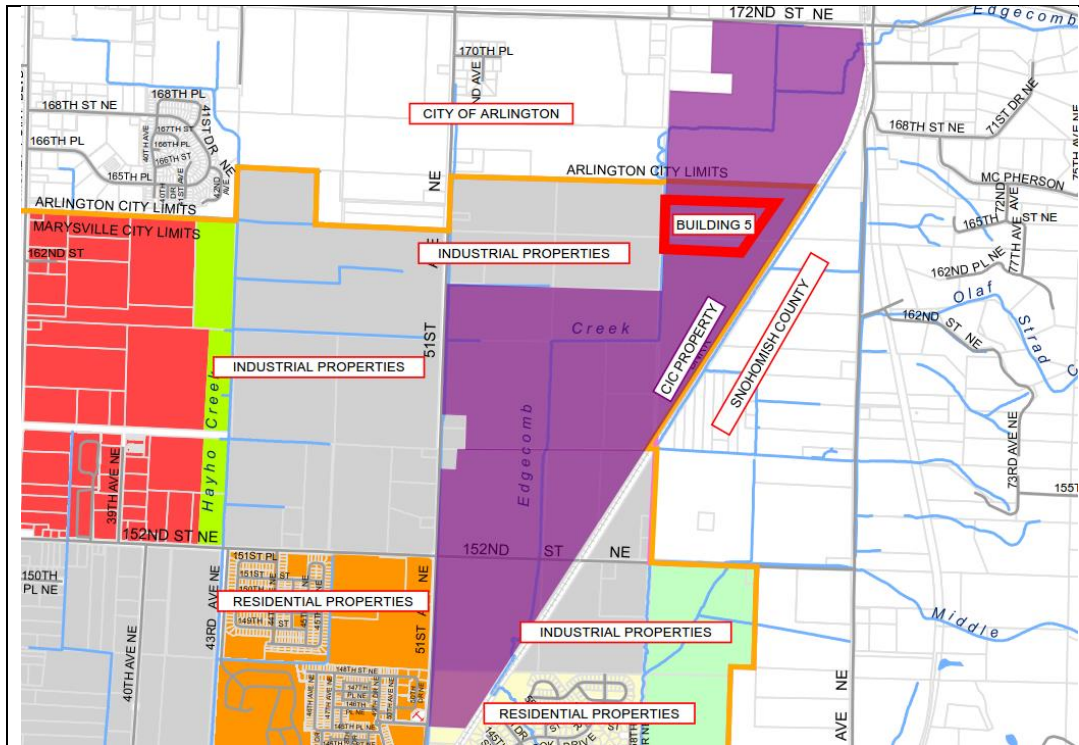


Figure 3: Site and Surrounding Properties – City of Marysville

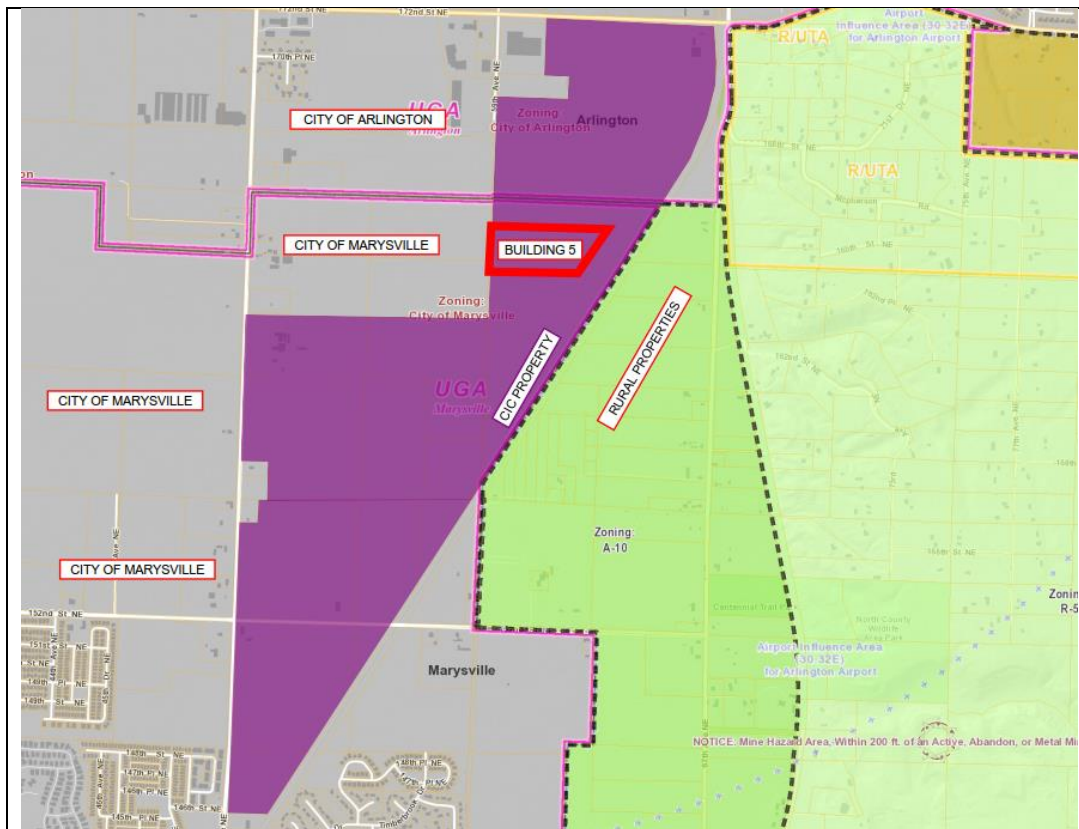


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15-minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to site is on the north side from the public road or from the southeast from the proposed public road.
 - The building has one loading dock on the south side of the building with 47 truck bays.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the north and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	S Loading Dock	3,500
		Truck Maneuvering	3,500
Northwest	Class B	S Loading Dock	2,800
		Truck Maneuvering	2,800
North	Class B	S Loading Dock	2,000
		Truck Maneuvering	2,000
Northeast	Class B	S Loading Dock	3,100
		Truck Maneuvering	3,100
North	Class C	S Loading Dock	1,800
		Truck Maneuvering	1,800

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	S Loading Dock	4,900
		Truck Maneuvering	4,900
South	Class A	S Loading Dock	5,300
		Truck Maneuvering	5,300
South	Class C	S Loading Dock	2,700
		Truck Maneuvering	2,700
West	Class C	S Loading Dock	275
		Truck Maneuvering	125

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	S Loading Dock	600
		Truck Maneuvering	600

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the PM peak hourly traffic volume generated at building 5 will be 86 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 13 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	13

There are estimated to be a maximum of 13 trucks travelling to/from the loading docks of building 5 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

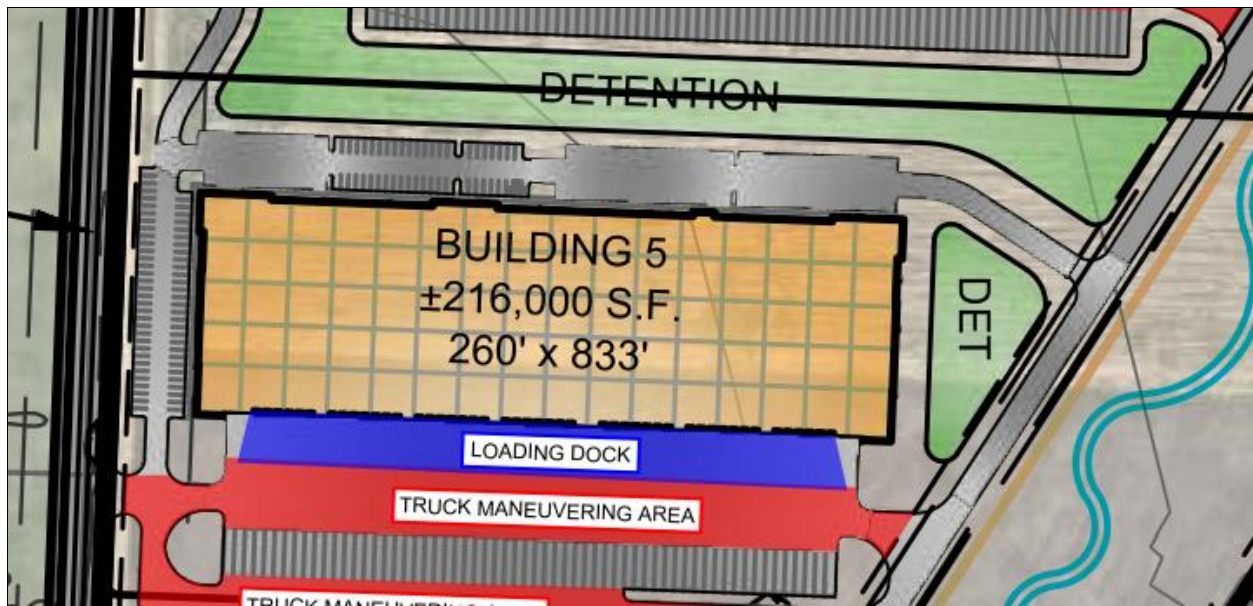


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit ¹	75 dBA at 25 feet
Heavy truck idling ¹	72 dBA at 25 feet
Truck engines starting noises ¹	74 dBA at 25 feet
Roller door opening/closing ²	65 dBA at 25 feet
Air brakes ²	65 – 75 dBA at 25 feet
Pallet being dragged and dropped ²	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. ²	60 dBA at 25 feet

1. These events occur for approximately 1 minute.

2. These events occur for short durations, a few seconds or less in duration.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 1 minute. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the northwest, north, and northeast; and the nearest Class C EDNA properties to the north, south, and west. The building will effectively block noise associated with the loading docks to the north, northeast, and northwest receiving properties.

Predicted Noise Levels – Truck Transit

The following section presents the predicted noise levels from the truck transit events to each of the receiving properties and compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	3,500 ft	-43	-10	22	30	37	13	12
SW	75	25 ft	4,900 ft	-46	-0	29	30	44	13	20
South	75	25 ft	5,300 ft	-47	-0	28	30	43	13	19
East	75	25 ft	600 ft	-28	-0	47	30	62	13	38

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NW	75	25 ft	2,800 ft	-41	-10	24	30	39	13	14
North	75	25 ft	2,000 ft	-38	-10	27	30	41	13	17
NE	75	25 ft	3,100 ft	-42	-10	23	30	38	13	13

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	1,800 ft	-37	-10	28	30	42	13	18
South	75	25 ft	2,700 ft	-41	-0	34	30	49	13	25
West	75	25 ft	125 ft	-14	-0	61	30	76	13	51

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following sections present the predicted noise levels from truck idling events to each of the receiving properties with the proposed mitigation. Trucks idling are predicted for a truck idling at the loading dock nearest the receiving property and compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	3,500 ft	-43	-13	43
SW Class A	72	25 ft	4,900 ft	-46	-0	46
South Class A	72	25 ft	5,300 ft	-47	-0	47
East Class A	72	25 ft	600 ft	-28	-0	28

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	72	25 ft	2,800 ft	-41	-13	41
North Class B	72	25 ft	2,000 ft	-38	-13	38
NE Class B	72	25 ft	3,100 ft	-42	-13	42

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	1,800 ft	-37	-13	37
South Class C	72	25 ft	2,700 ft	-41	-0	41
West Class C	72	25 ft	275 ft	-21	-0	21

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following sections present the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	3,500 ft	-43	-13	18
SW Class A	74	25 ft	4,900 ft	-46	-0	28
South Class A	74	25 ft	5,300 ft	-47	-0	27
East Class A	74	25 ft	600 ft	-28	-0	46

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	74	25 ft	2,800 ft	-41	-13	20
North Class B	74	25 ft	2,000 ft	-38	-13	23
NE Class B	74	25 ft	3,100 ft	-42	-13	19

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	1,800 ft	-37	-13	24
South Class C	74	25 ft	2,700 ft	-41	-0	33
West Class C	74	25 ft	275 ft	-21	-0	53

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following sections present the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	3,500 ft	-43	-13	19
SW Class A	75	25 ft	4,900 ft	-46	-0	29
South Class A	75	25 ft	5,300 ft	-47	-0	28
East Class A	75	25 ft	600 ft	-28	-0	47

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	75	25 ft	2,800 ft	-41	-13	21
North Class B	75	25 ft	2,000 ft	-38	-13	24
NE Class B	75	25 ft	3,100 ft	-42	-13	20

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	1,800 ft	-37	-13	25
South Class C	75	25 ft	2,700 ft	-41	-0	34
West Class C	75	25 ft	275 ft	-21	-0	54

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

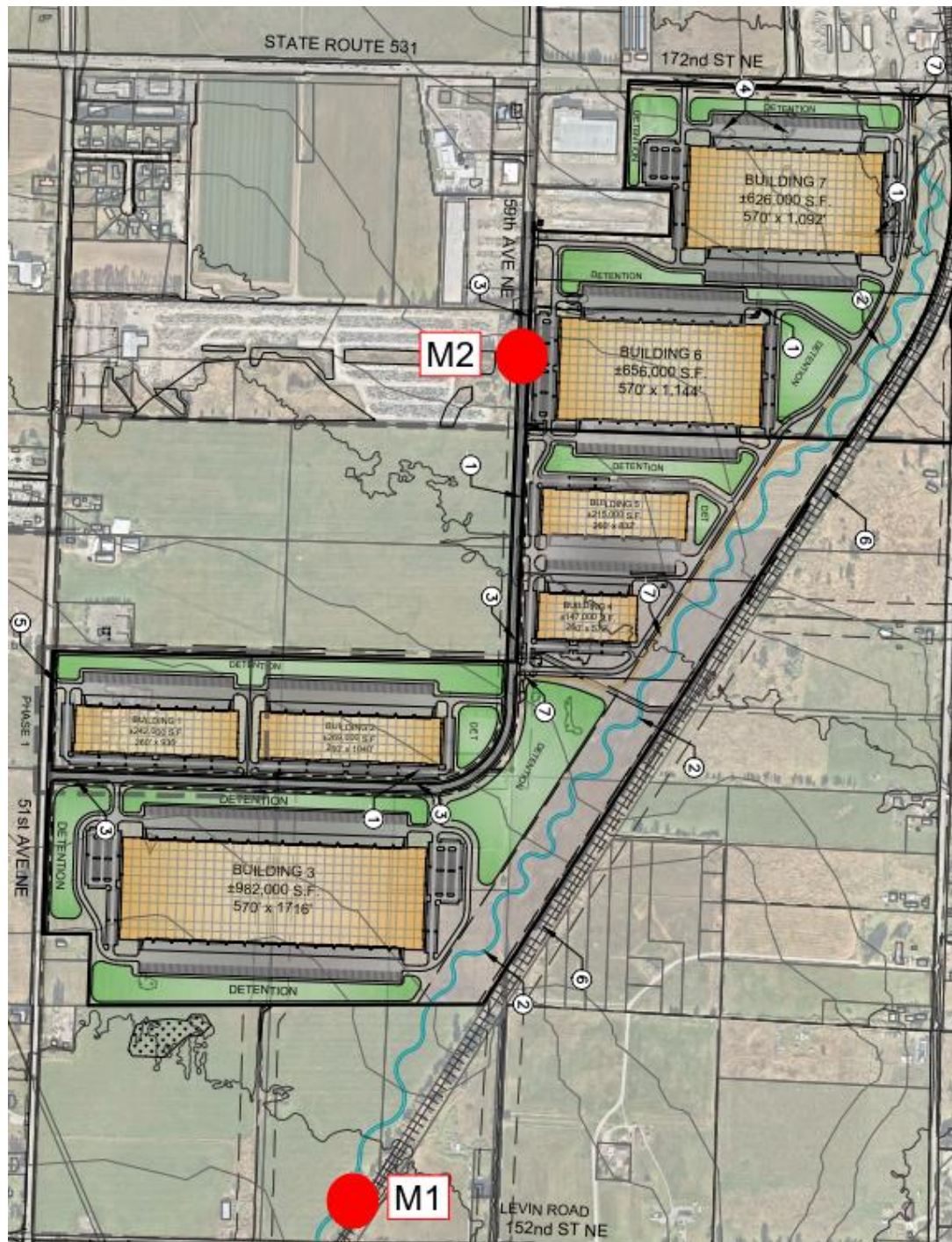
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, L_{eq} . The L_{eq} is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The L_{eq} is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

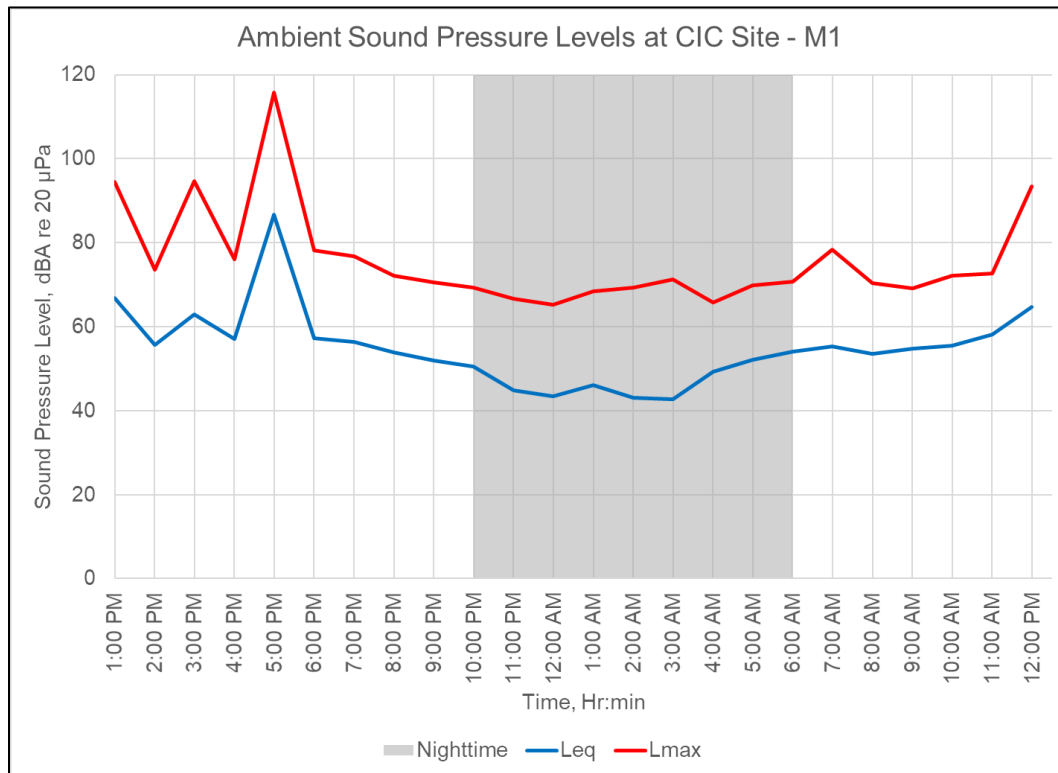


Figure 6: Hourly Noise Levels – Location M1

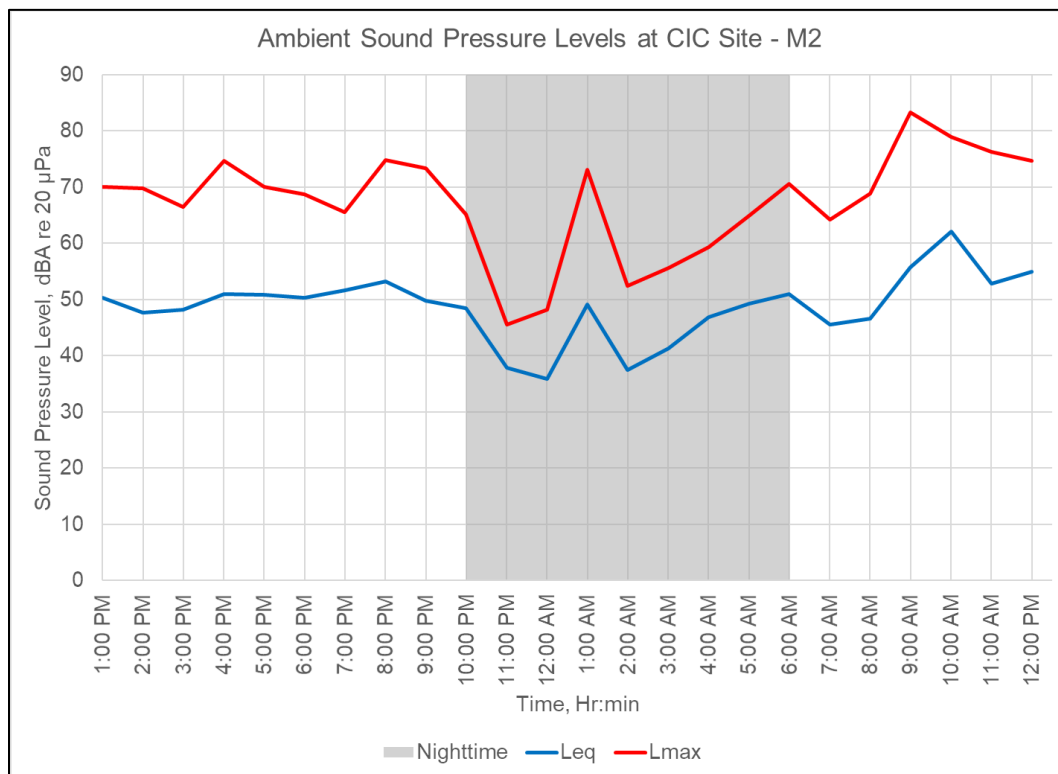


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 6

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 6
PROJECT #: 20-7619
PREPARED BY: Steve Hedback



SIGNED:

DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 6 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 6 outlined in red.

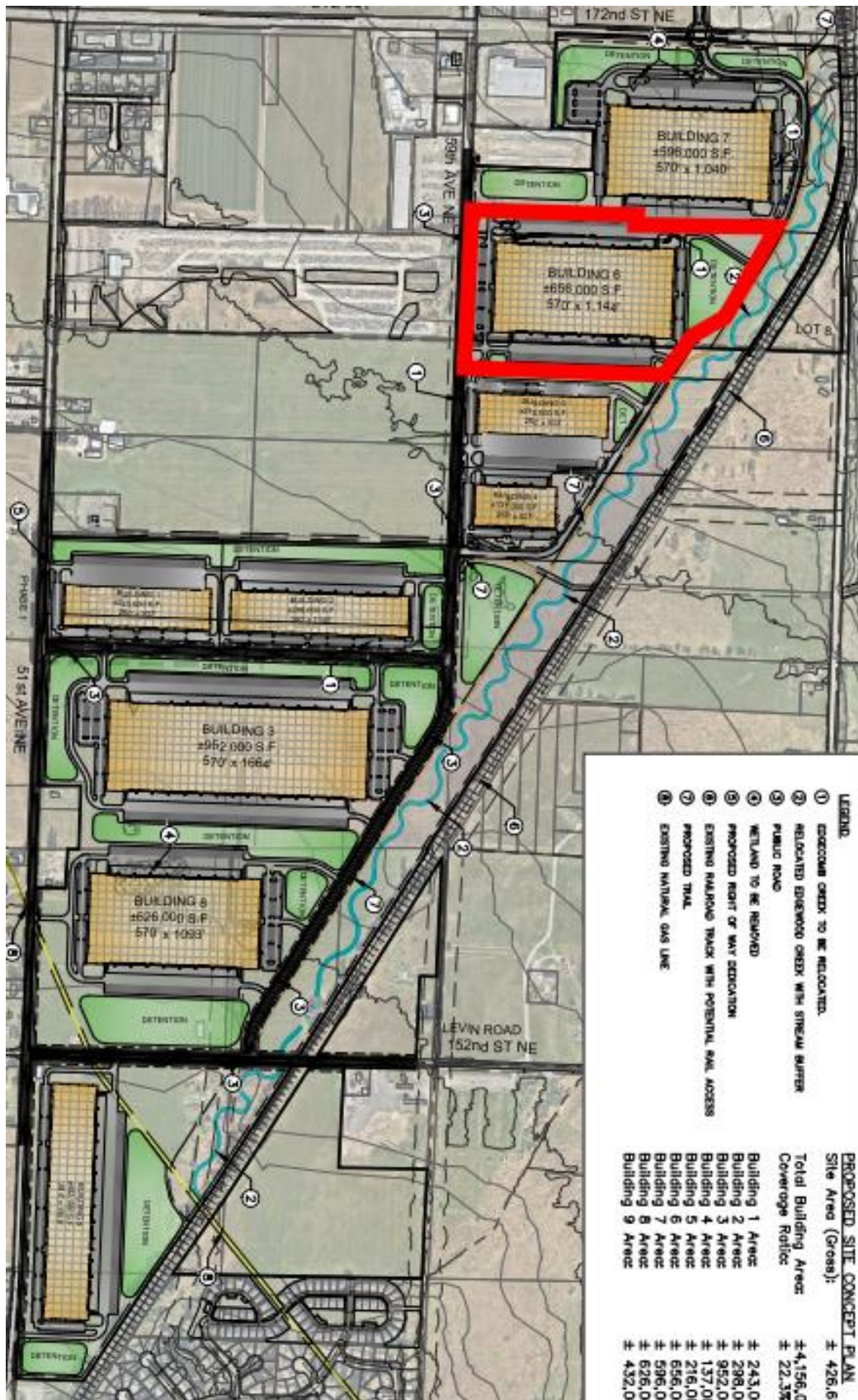


Figure 1: Cascade Industrial Center

II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
North	Marysville	LI	Industrial
South	Marysville	LI	Industrial
West	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

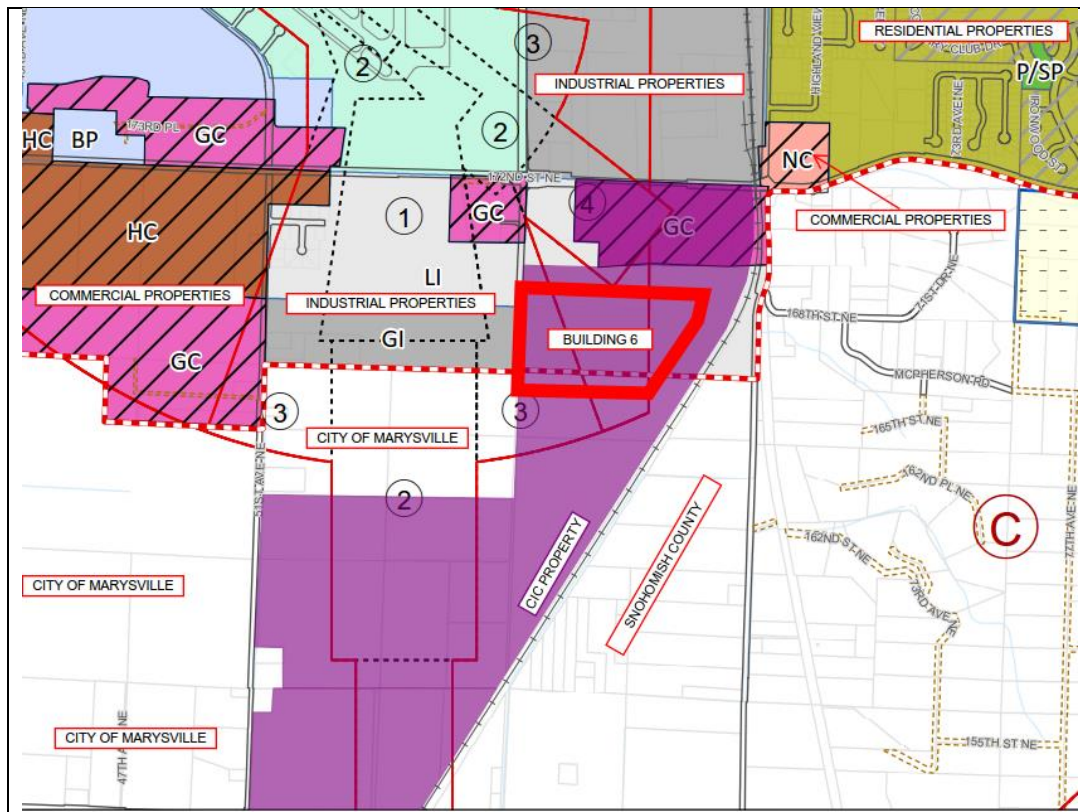


Figure 2: Site and Surrounding Properties – City of Arlington

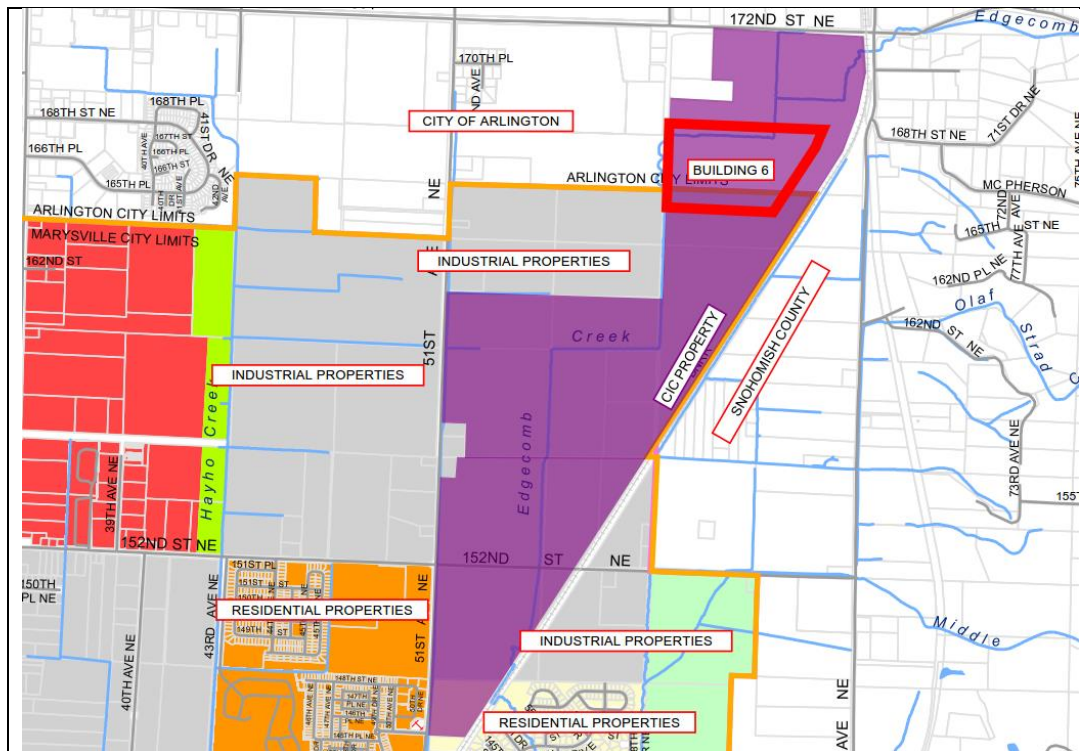


Figure 3: Site and Surrounding Properties – City of Marysville

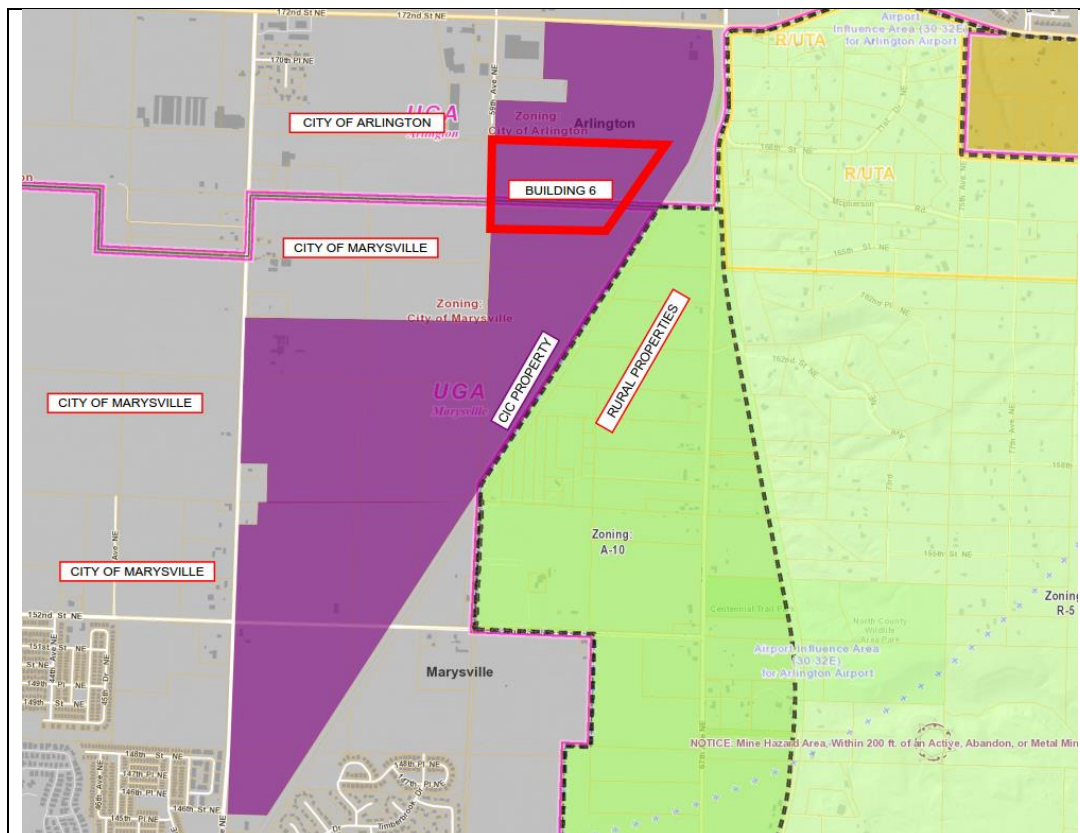


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15-minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to site is on the north side from the public road or from the southeast from the proposed public road.
 - The building has two loading docks, one on the north side and one on the side of the building with 58 truck bays each.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the east and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	N Loading Dock	2,300
		Truck Maneuvering	2,300
Northwest	Class B	N Loading Dock	3,000
		Truck Maneuvering	2,800
North	Class B	N Loading Dock	750
		Truck Maneuvering	550
Northeast	Class B	N Loading Dock	2,400
		Truck Maneuvering	1,900
North	Class C	N Loading Dock	425
		Truck Maneuvering	375

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	S Loading Dock	5,300
		Truck Maneuvering	5,600
South	Class A	S Loading Dock	6,000
		Truck Maneuvering	5,900
South	Class C	N Loading Dock	3,300
		Truck Maneuvering	3,300
West	Class C	N Loading Dock	425
		Truck Maneuvering	125

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	S Loading Dock	650
		Truck Maneuvering	450

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the PM peak hourly traffic volume generated at building 6 will be 52 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 8 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	8

There are estimated to be a maximum of 8 trucks travelling to/from the loading docks of building 6 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

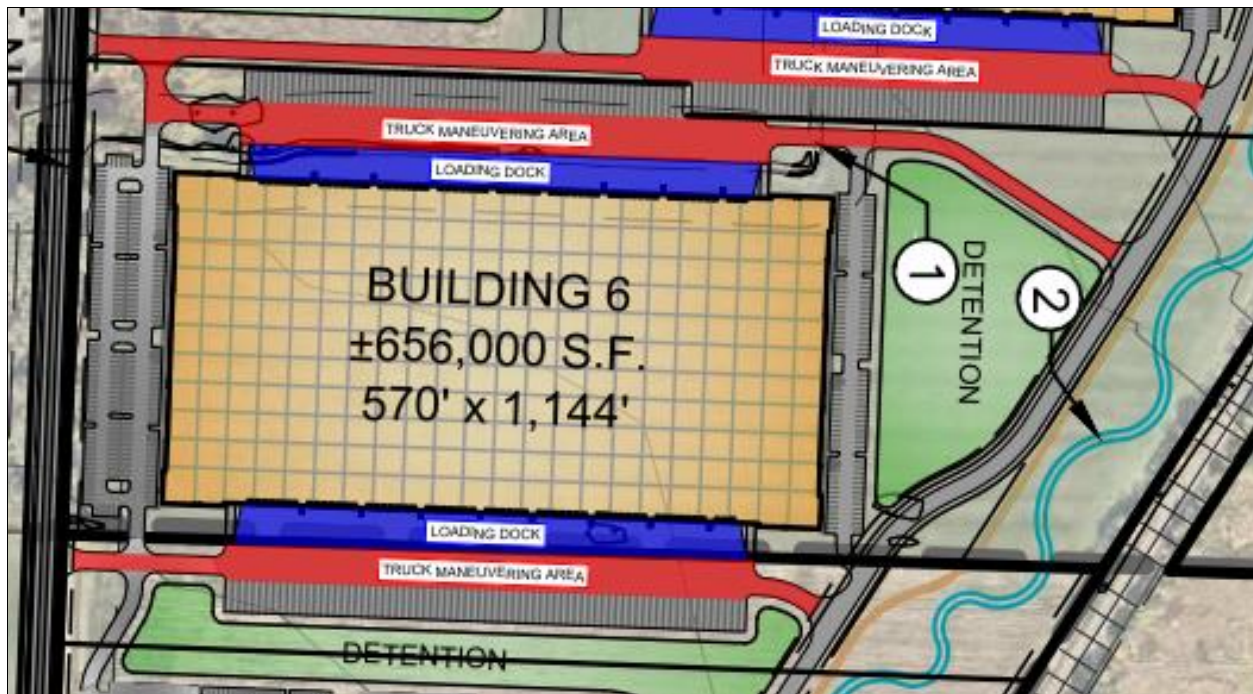


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit ¹	75 dBA at 25 feet
Heavy truck idling ¹	72 dBA at 25 feet
Truck engines starting noises ¹	74 dBA at 25 feet
Roller door opening/closing ²	65 dBA at 25 feet
Air brakes ²	65 – 75 dBA at 25 feet
Pallet being dragged and dropped ²	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. ²	60 dBA at 25 feet

1. These events occur for approximately 1 minute.

2. These events occur for short durations, a few seconds or less in duration.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 1 minute. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the west, north, and northeast; and the nearest Class C EDNA properties to the north, south, and west.

Predicted Noise Levels – Truck Transit

The following section presents the predicted noise levels from the truck transit events to each of the receiving properties and compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	2,000 ft	-38	-0	37	30	52	8	25
SW	75	25 ft	5,300 ft	-46	-0	29	30	44	8	17
South	75	25 ft	5,900 ft	-47	-0	28	30	42	8	16
East	75	25 ft	400 ft	-24	-0	51	30	66	8	39

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
West	75	25 ft	2,800 ft	-41	-0	34	30	49	8	22
North	75	25 ft	550 ft	-27	-0	48	30	63	8	36
NE	75	25 ft	1,600 ft	-36	-0	39	30	54	8	27

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	375 ft	-24	-0	51	30	66	8	40
South	75	25 ft	3,300 ft	-42	-0	33	30	47	8	21
West	75	25 ft	125 ft	-14	-0	61	30	76	8	49

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following sections present the predicted noise levels from truck idling events to each of the receiving properties with the proposed mitigation. Trucks idling are predicted for a truck idling at the loading dock nearest the receiving property and compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	2,300 ft	-39	-0	33
SW Class A	72	25 ft	5,600 ft	-47	-0	25
South Class A	72	25 ft	6,000 ft	-48	-0	24
East Class A	72	25 ft	650 ft	-28	-0	44

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
West Class B	72	25 ft	3,000 ft	-42	-0	30
North Class B	72	25 ft	750 ft	-30	-0	42
NE Class B	72	25 ft	1,900 ft	-38	-0	34

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	425 ft	-25	-0	47
South Class C	72	25 ft	3,300 ft	-42	-0	30
West Class C	72	25 ft	425 ft	-25	-0	47

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following sections present the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	2,300 ft	-39	-0	35
SW Class A	74	25 ft	5,600 ft	-47	-0	27
South Class A	74	25 ft	6,000 ft	-48	-0	26
East Class A	74	25 ft	650 ft	-28	-0	45

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
West Class B	74	25 ft	3,000 ft	-42	-0	31
North Class B	74	25 ft	750 ft	-30	-0	44
NE Class B	74	25 ft	1,900 ft	-38	-0	36

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	425 ft	-25	-0	49
South Class C	74	25 ft	3,300 ft	-42	-0	32
West Class C	74	25 ft	425 ft	-25	-0	49

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following sections present the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	2,300 ft	-39	-0	36
SW Class A	75	25 ft	5,600 ft	-47	-0	28
South Class A	75	25 ft	6,000 ft	-48	-0	27
East Class A	75	25 ft	650 ft	-28	-0	46

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
West Class B	75	25 ft	3,000 ft	-42	-0	32
North Class B	75	25 ft	750 ft	-30	-0	45
NE Class B	75	25 ft	1,900 ft	-38	-0	37

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	425 ft	-25	-0	50
South Class C	75	25 ft	3,300 ft	-42	-0	33
West Class C	75	25 ft	425 ft	-25	-0	50

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

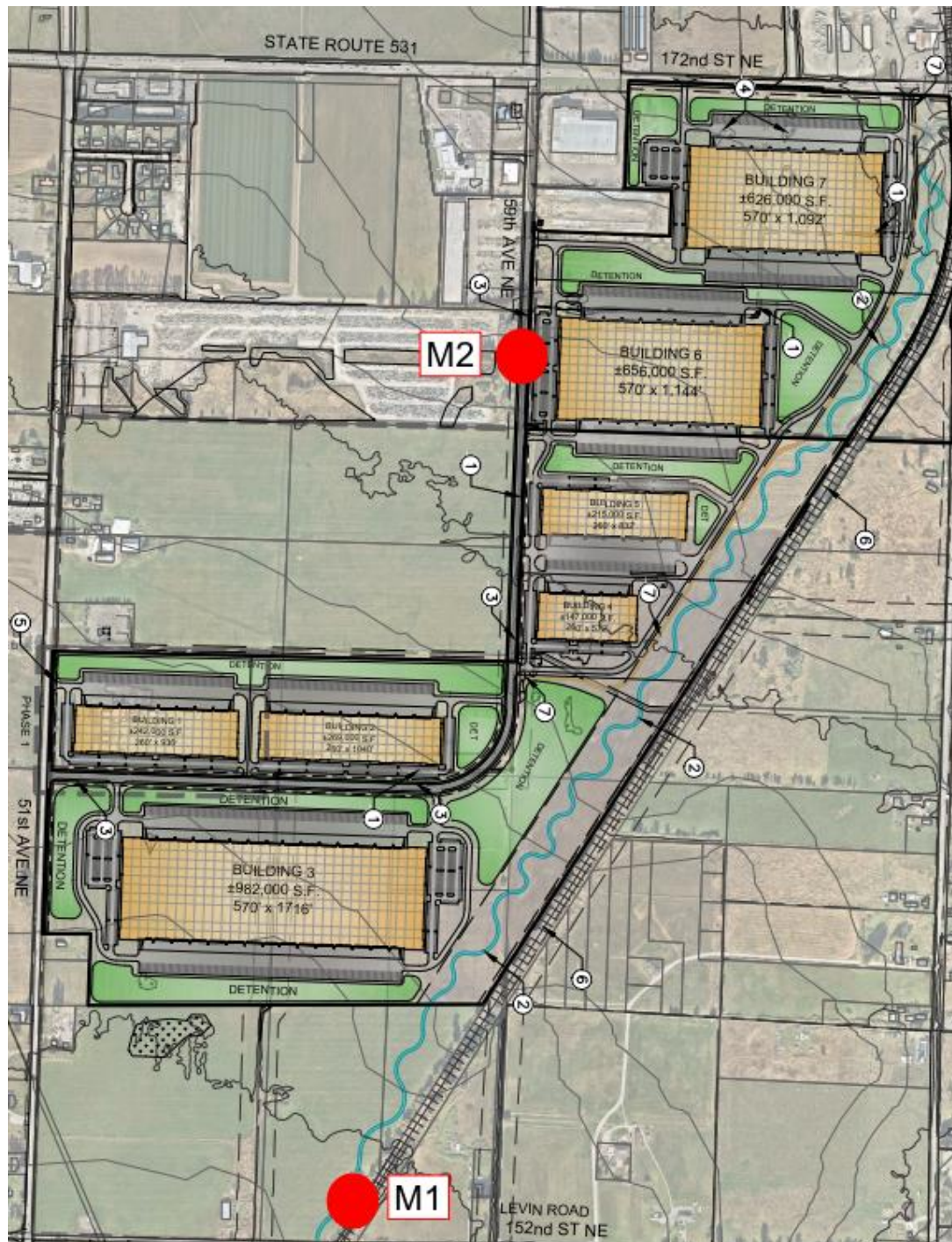
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, L_{eq} . The L_{eq} is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The L_{eq} is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

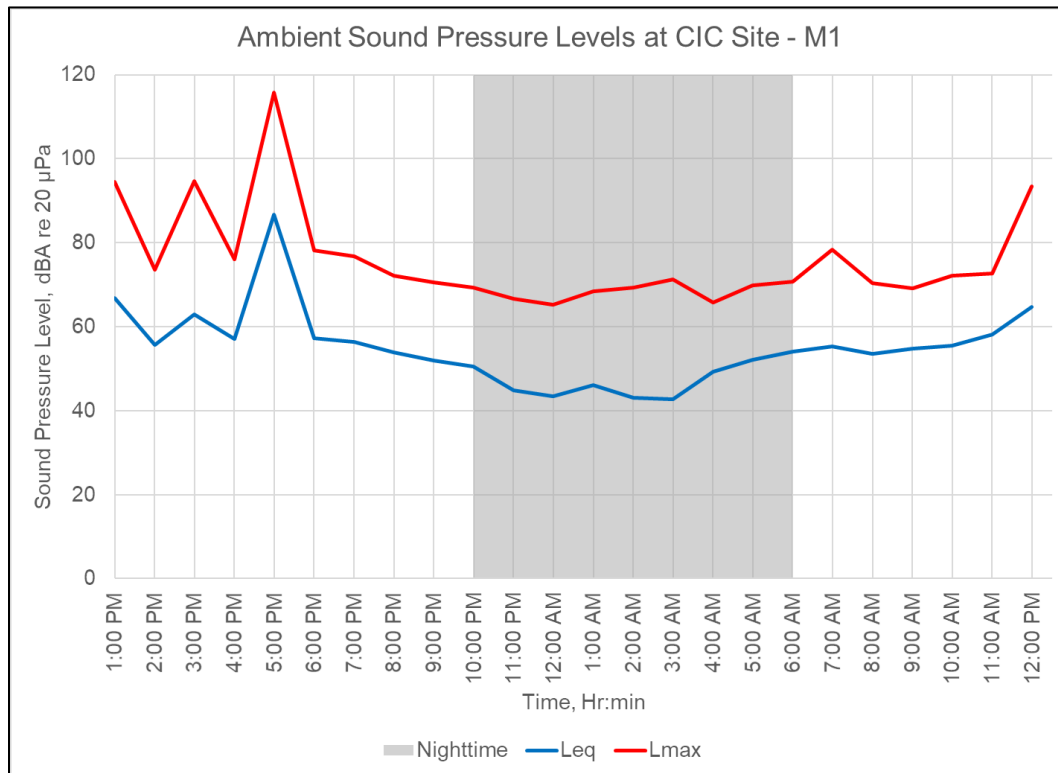


Figure 6: Hourly Noise Levels – Location M1

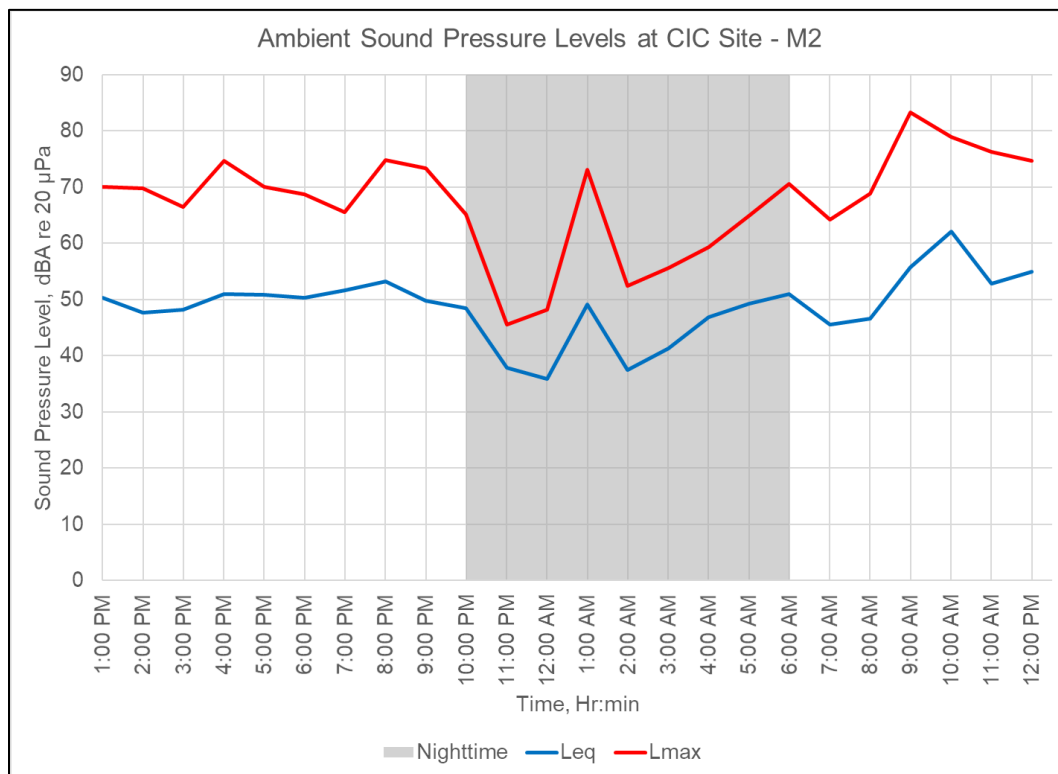


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 7

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 7
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 7 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 7 outlined in red.

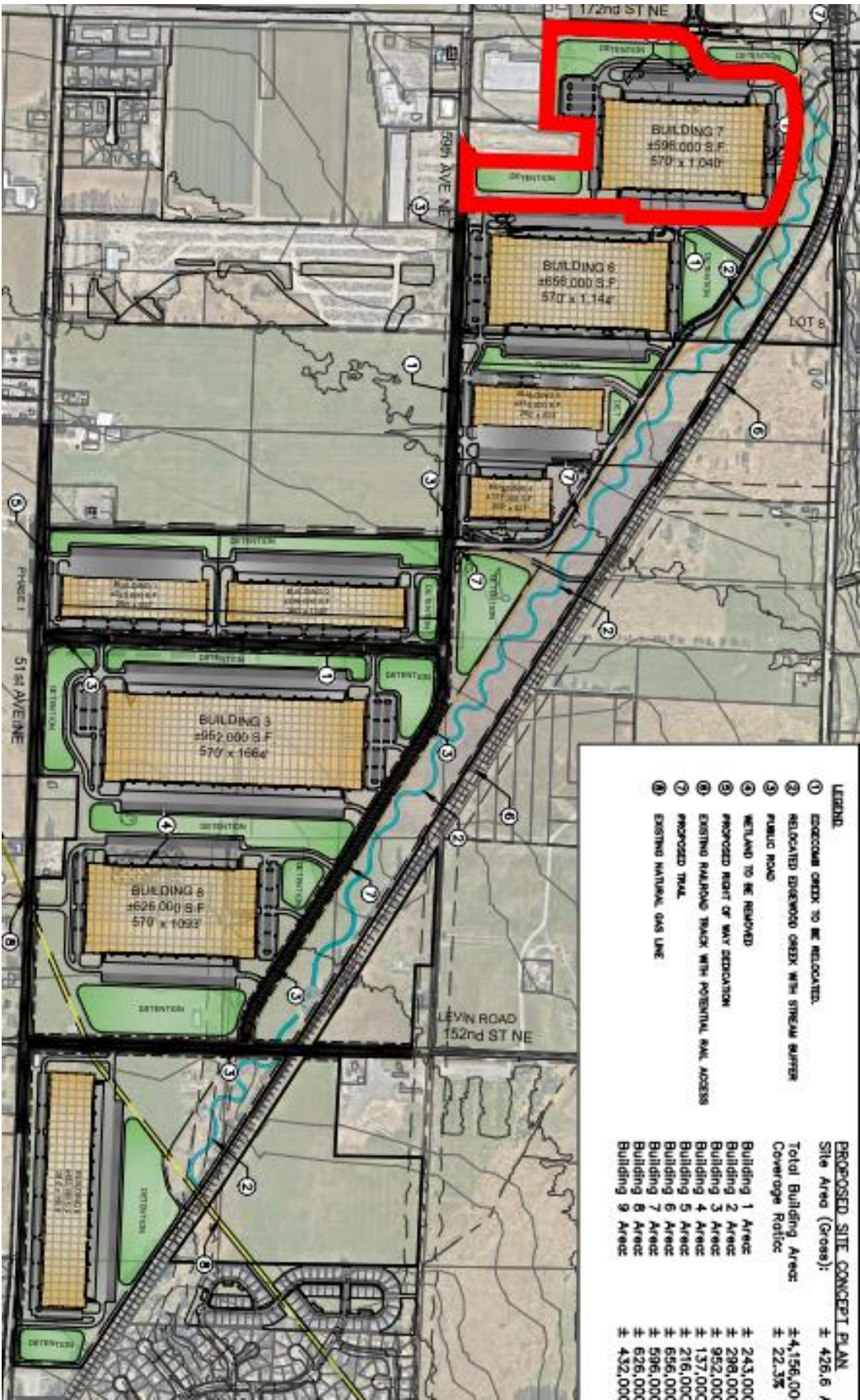


Figure 1: Cascade Industrial Center

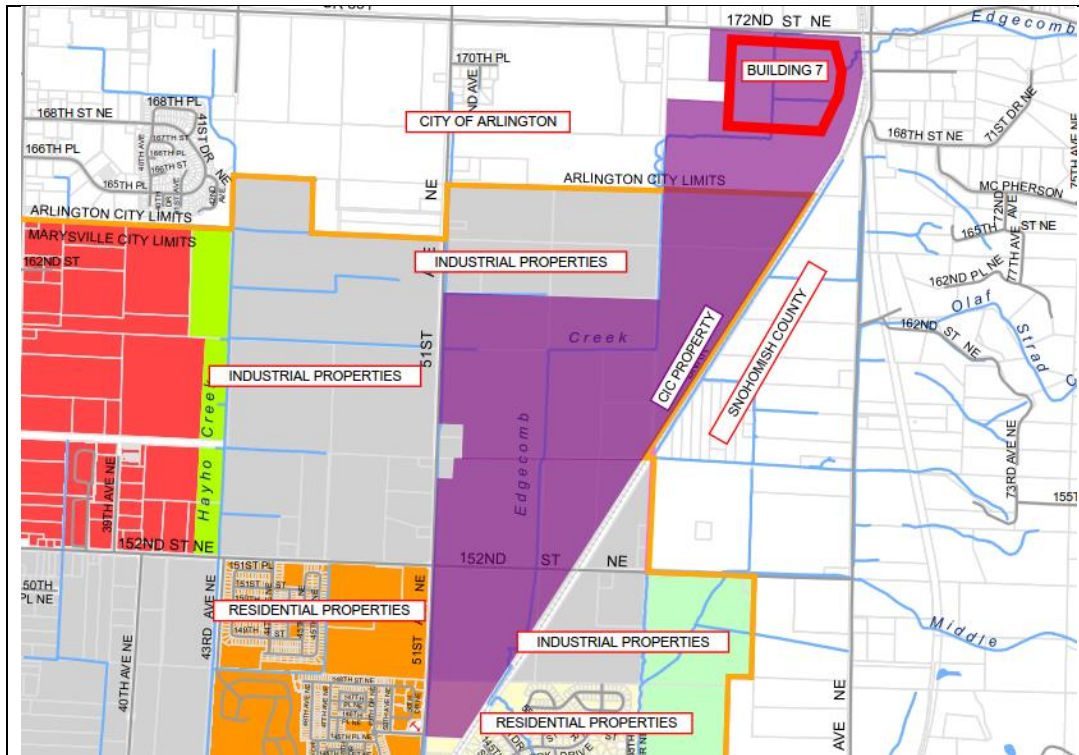


Figure 3: Site and Surrounding Properties – City of Marysville

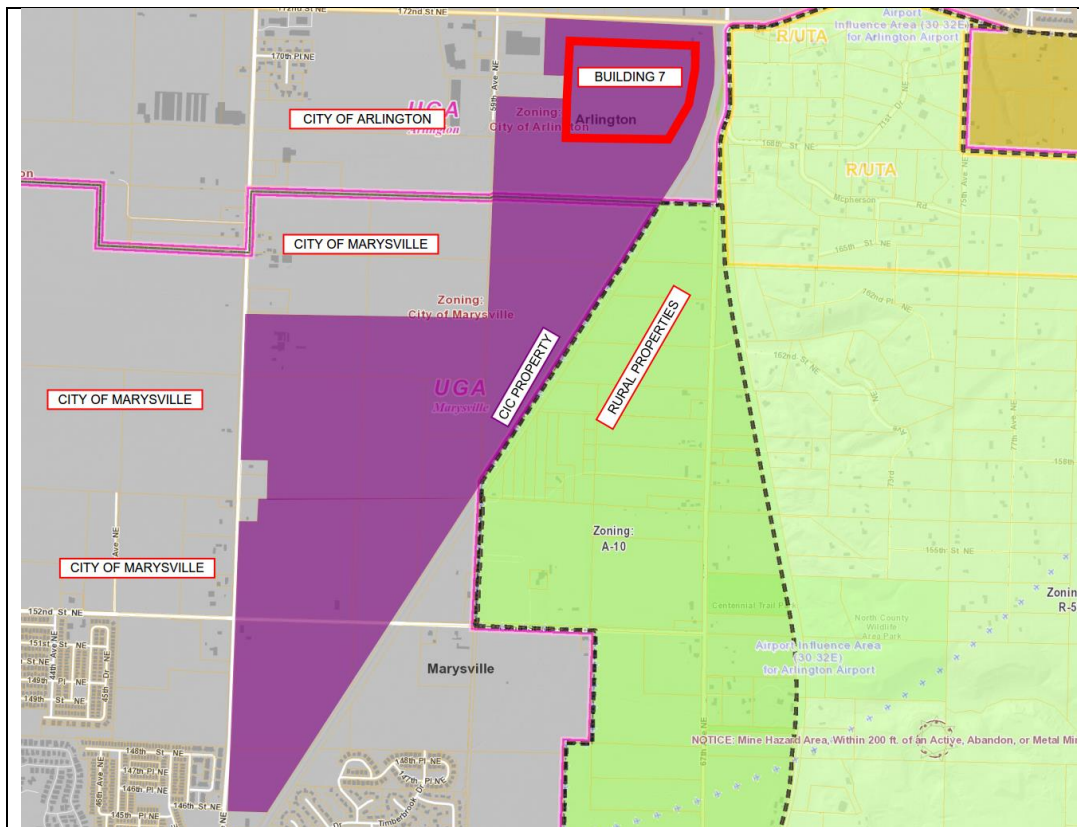


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15-minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to site is on the north side from the public road or from the southeast from the proposed public road.
 - The building has two loading docks, one on the north side and one on the side of the building with 51 truck bays each.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the east and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	N Loading Dock	1,400
		Truck Maneuvering	1,100
Northwest	Class B	N Loading Dock	950
		Truck Maneuvering	900
West	Class B	N Loading Dock	1,100
		Truck Maneuvering	1,100
Northeast	Class B	N Loading Dock	900
		Truck Maneuvering	600
North	Class C	S Loading Dock	450
		Truck Maneuvering	275
West	Class C	s Loading Dock	300
		Truck Maneuvering	300

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	S Loading Dock	6,700
		Truck Maneuvering	6,600
South	Class A	S Loading Dock	7,000
		Truck Maneuvering	7,000
		Truck Maneuvering	1,350

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	S Loading Dock	600
		Truck Maneuvering	350

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the PM peak hourly traffic volume generated at building 7 will be 48 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 7 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	7

There are estimated to be a maximum of 7 trucks travelling to/from the loading docks of building 7 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

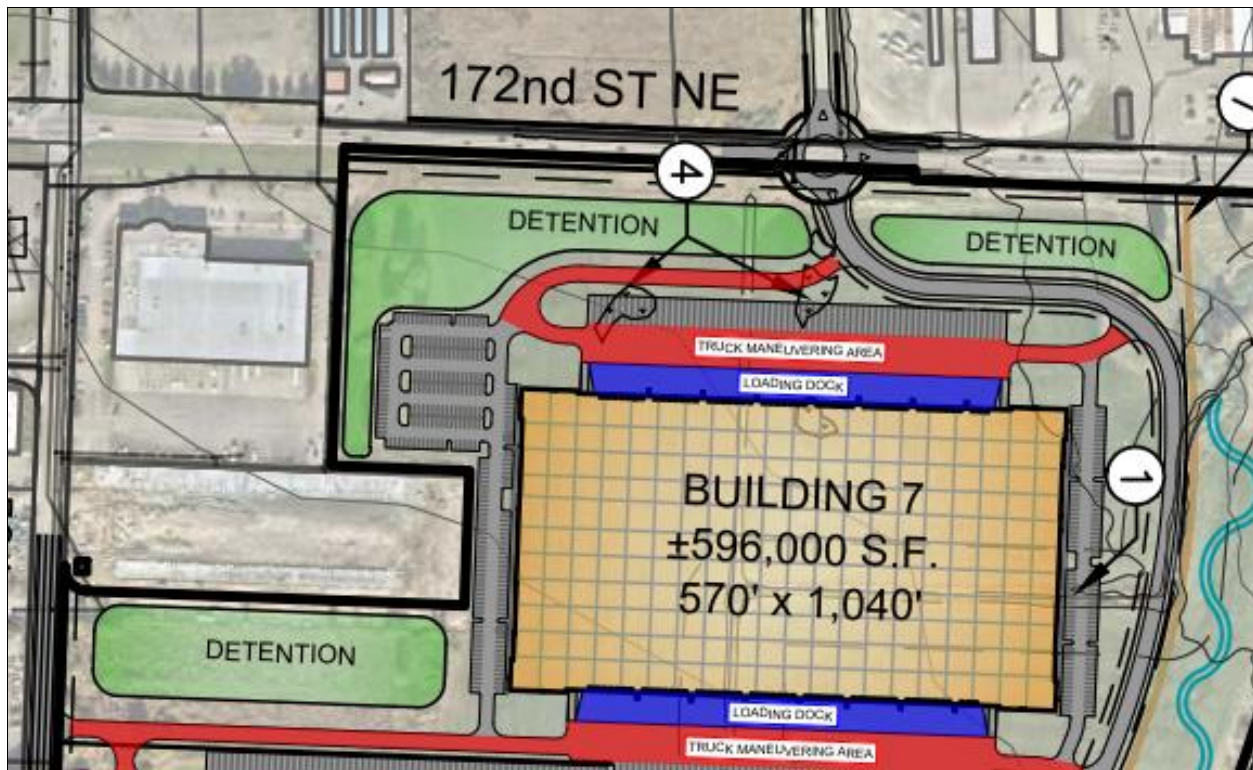


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit ¹	75 dBA at 25 feet
Heavy truck idling ¹	72 dBA at 25 feet
Truck engines starting noises ¹	74 dBA at 25 feet
Roller door opening/closing ²	65 dBA at 25 feet
Air brakes ²	65 – 75 dBA at 25 feet
Pallet being dragged and dropped ²	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. ²	60 dBA at 25 feet

1. These events occur for approximately 1 minute.

2. These events occur for short durations, a few seconds or less in duration.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 1 minute. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the west and northeast; and the nearest Class C EDNA properties to the north and west.

Predicted Noise Levels – Truck Transit

The following section presents the predicted noise levels from the truck transit events to each of the receiving properties and compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	1,100 ft	-33	-0	42	30	57	7	30
SW	75	25 ft	6,600 ft	-48	-0	27	30	41	7	14
South	75	25 ft	7,000 ft	-49	-0	26	30	41	7	14
East	75	25 ft	350 ft	-23	-0	52	30	67	7	40

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
West	75	25 ft	1,100 ft	-33	-0	42	30	57	7	30
NE	75	25 ft	600 ft	-28	-0	47	30	62	7	35

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	275 ft	-21	-0	54	30	69	7	42
West	75	25 ft	300 ft	-22	0	53	30	68	7	41

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following sections present the predicted noise levels from truck idling events to each of the receiving properties with the proposed mitigation. Trucks idling are predicted for a truck idling at the loading dock nearest the receiving property and compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	1,100 ft	-35	-0	37
SW Class A	72	25 ft	6,700 ft	-49	-0	23
South Class A	72	25 ft	7,000 ft	-49	-0	23
East Class A	72	25 ft	600 ft	-28	-0	44

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
West Class B	72	25 ft	1,100 ft	-33	-0	39
NE Class B	72	25 ft	600 ft	-31	-0	41

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	275 ft	-33	-0	39
West Class C	72	25 ft	300 ft	-22	0	50

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following sections present the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	1,100 ft	-35	-0	39
SW Class A	74	25 ft	6,700 ft	-49	-0	25
South Class A	74	25 ft	7,000 ft	-49	-0	25
East Class A	74	25 ft	600 ft	-28	-0	46

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
West Class B	74	25 ft	1,100 ft	-33	-0	41
NE Class B	74	25 ft	600 ft	-31	-0	43

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	275 ft	-33	-0	41
West Class C	74	25 ft	300 ft	-22	0	52

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following sections present the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	1,100 ft	-35	-0	40
SW Class A	75	25 ft	6,700 ft	-49	-0	26
South Class A	75	25 ft	7,000 ft	-49	-0	26
East Class A	75	25 ft	600 ft	-28	-0	47

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
West Class B	75	25 ft	1,100 ft	-33	-0	42
NE Class B	75	25 ft	600 ft	-31	-0	44

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	275 ft	-33	-0	42
West Class C	75	25 ft	300 ft	-22	0	53

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

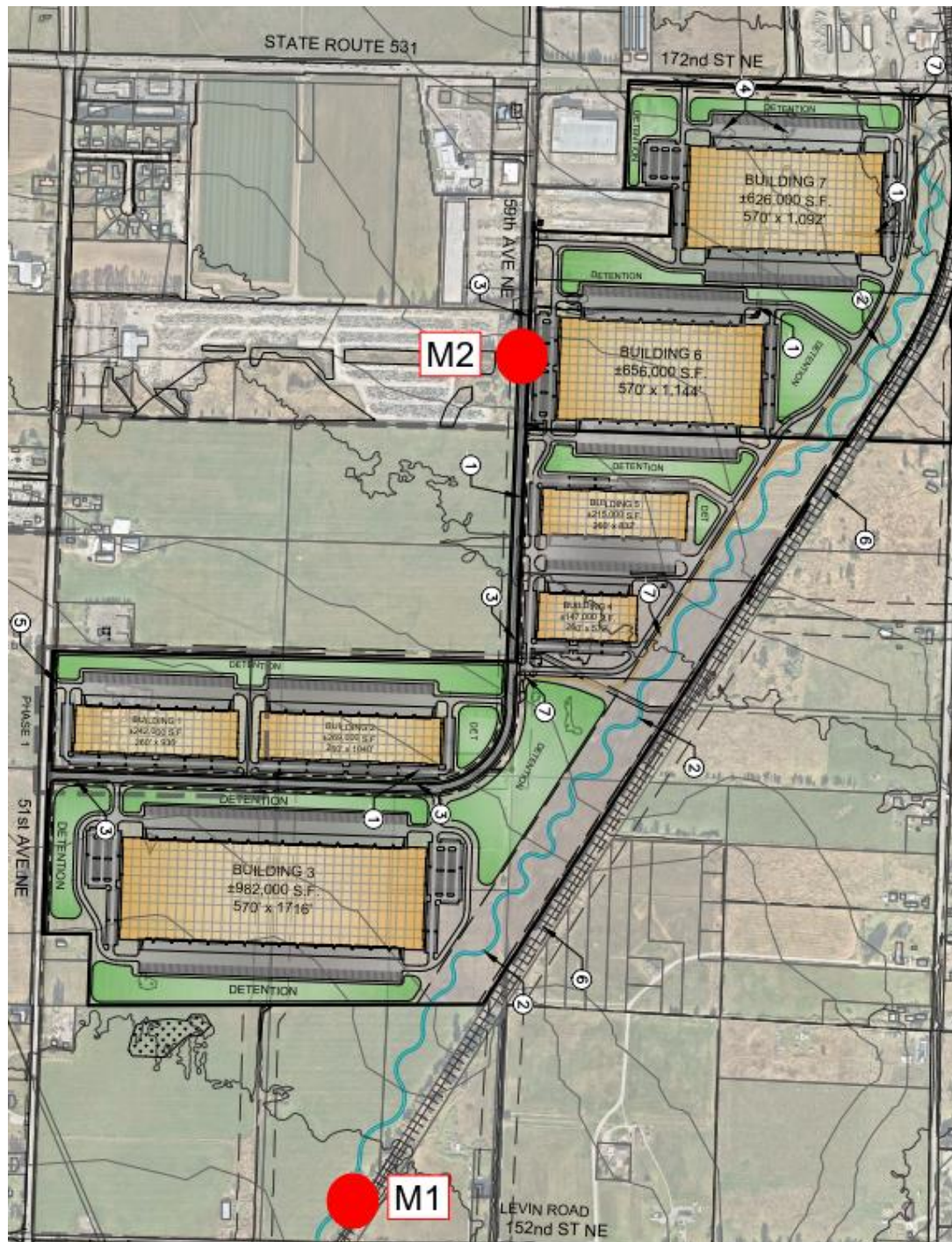
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, L_{eq} . The L_{eq} is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The L_{eq} is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

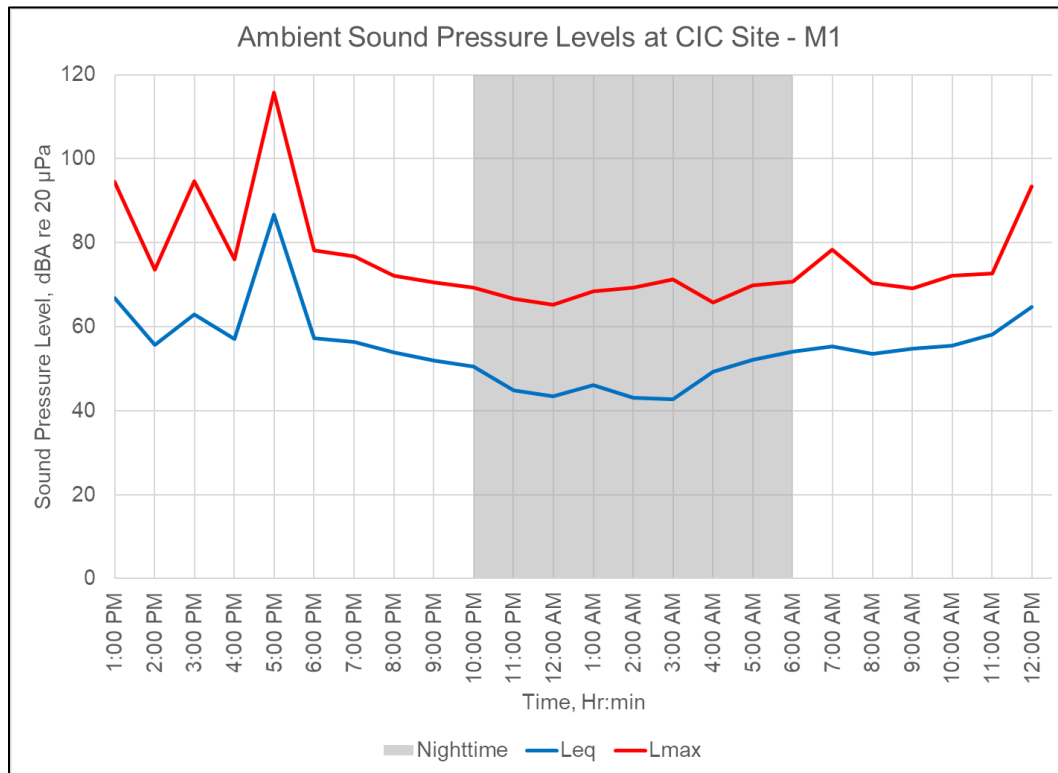


Figure 6: Hourly Noise Levels – Location M1

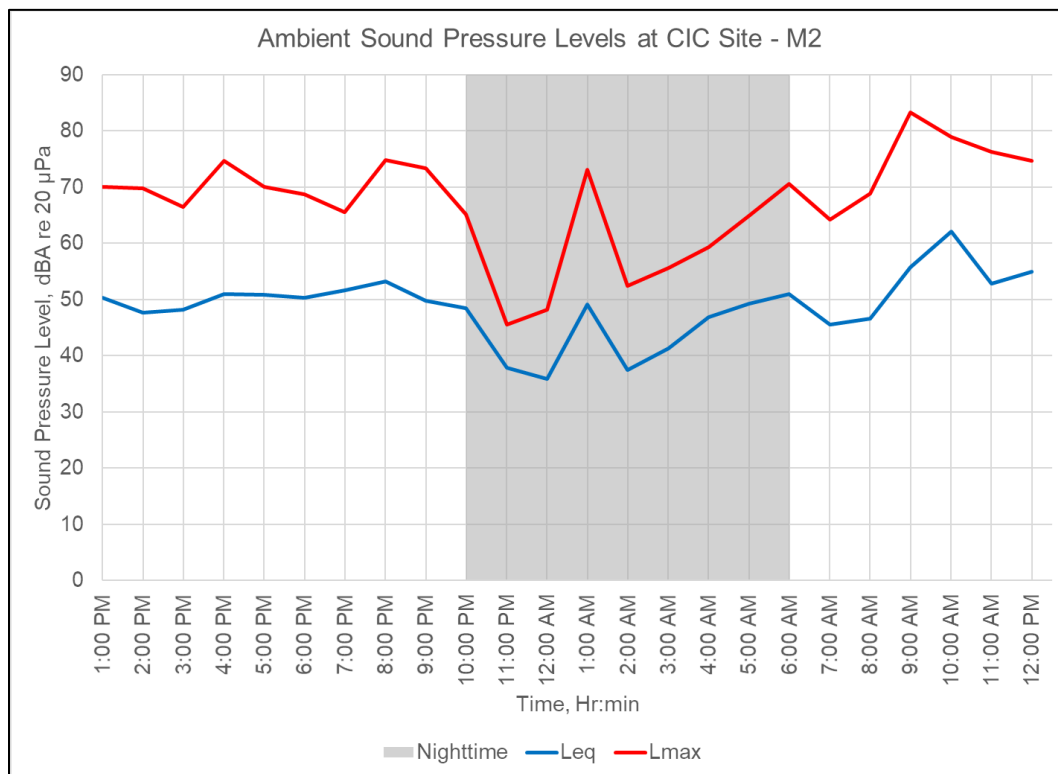


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 8

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 8
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 8 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 8 outlined in red.

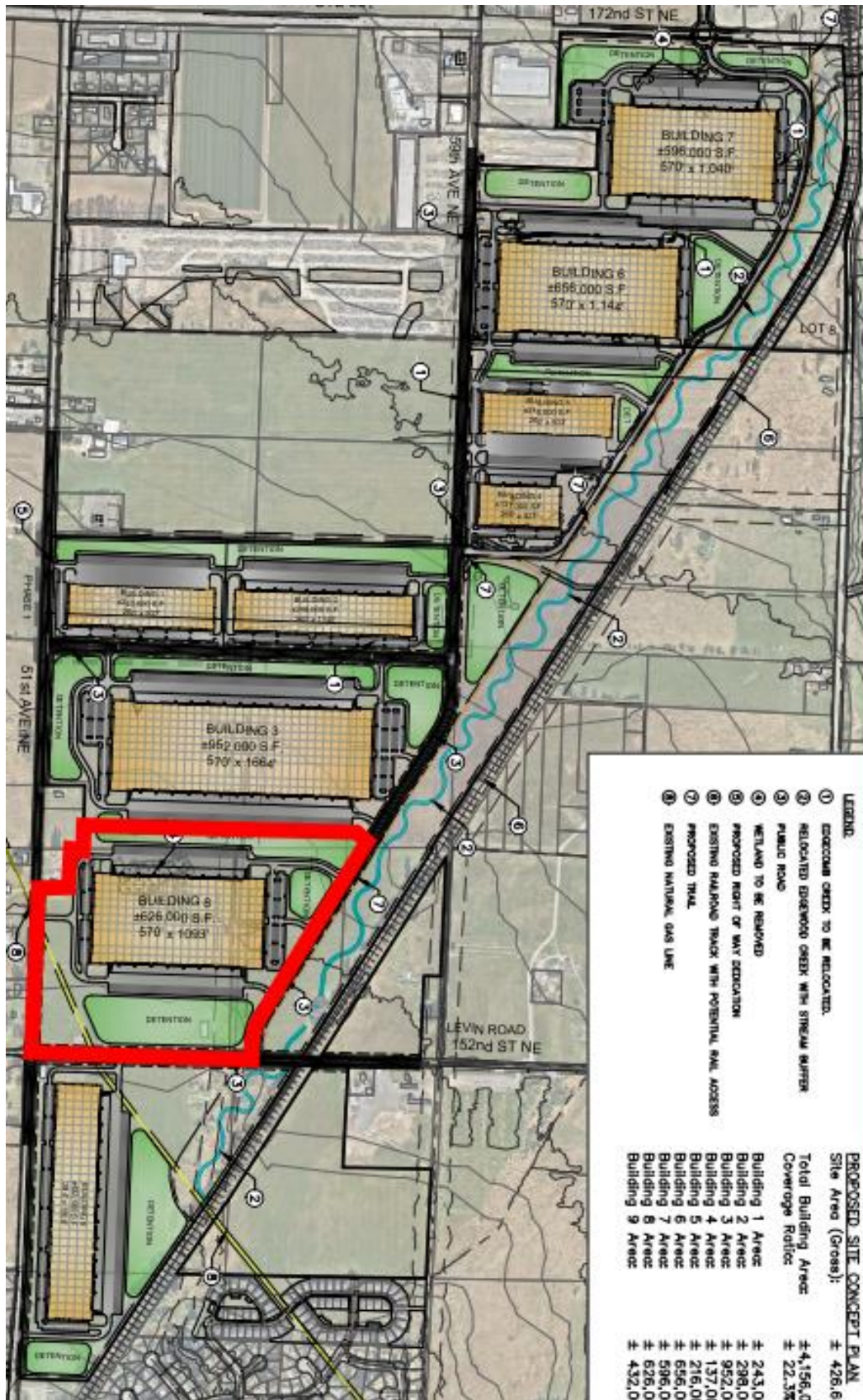


Figure 1: Cascade Industrial Center

II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
North	Marysville	LI	Industrial
SE	Marysville	LI	Industrial
West	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

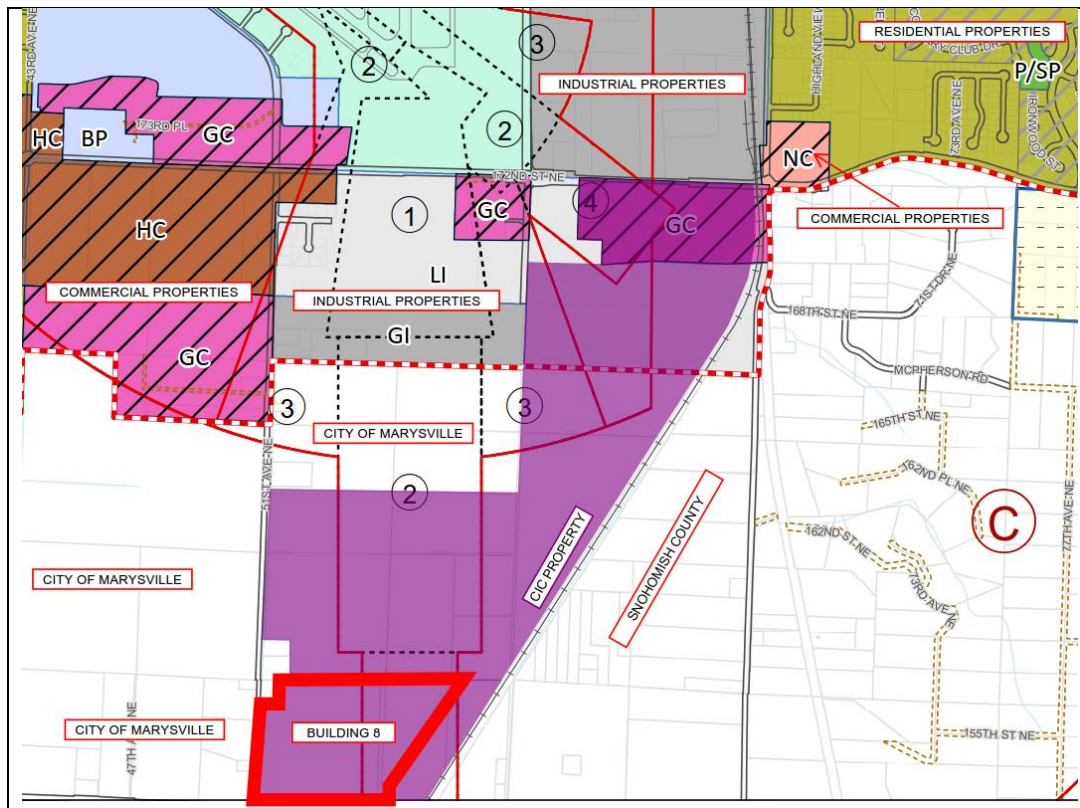


Figure 2: Site and Surrounding Properties – City of Arlington

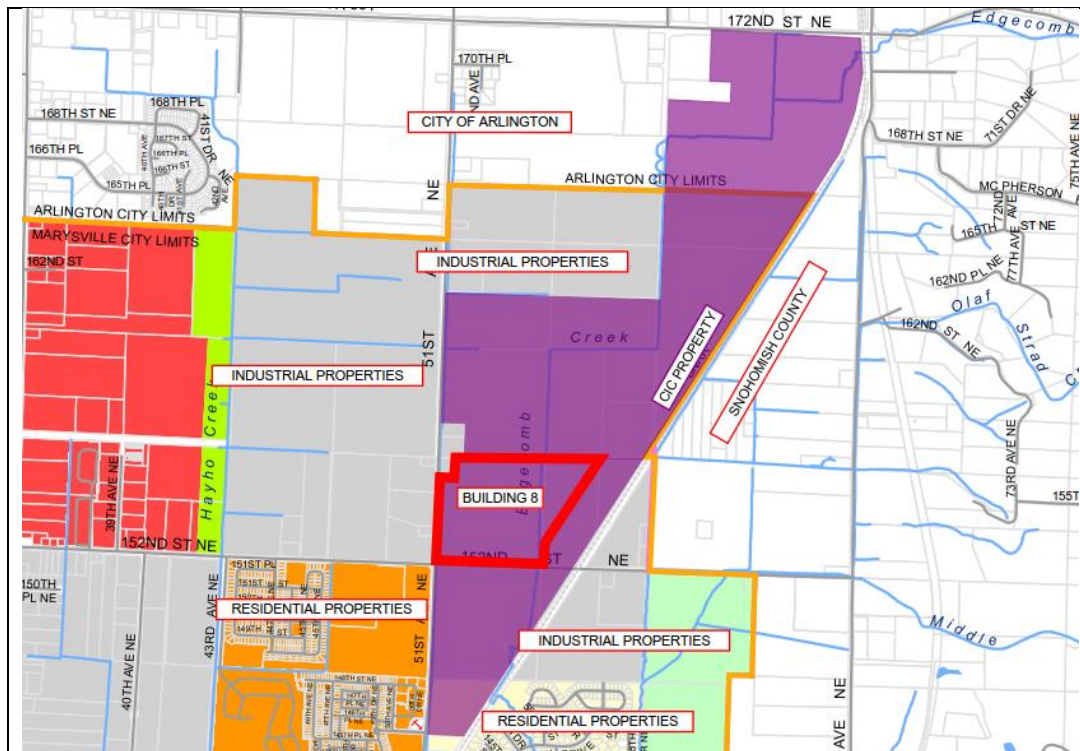


Figure 3: Site and Surrounding Properties – City of Marysville

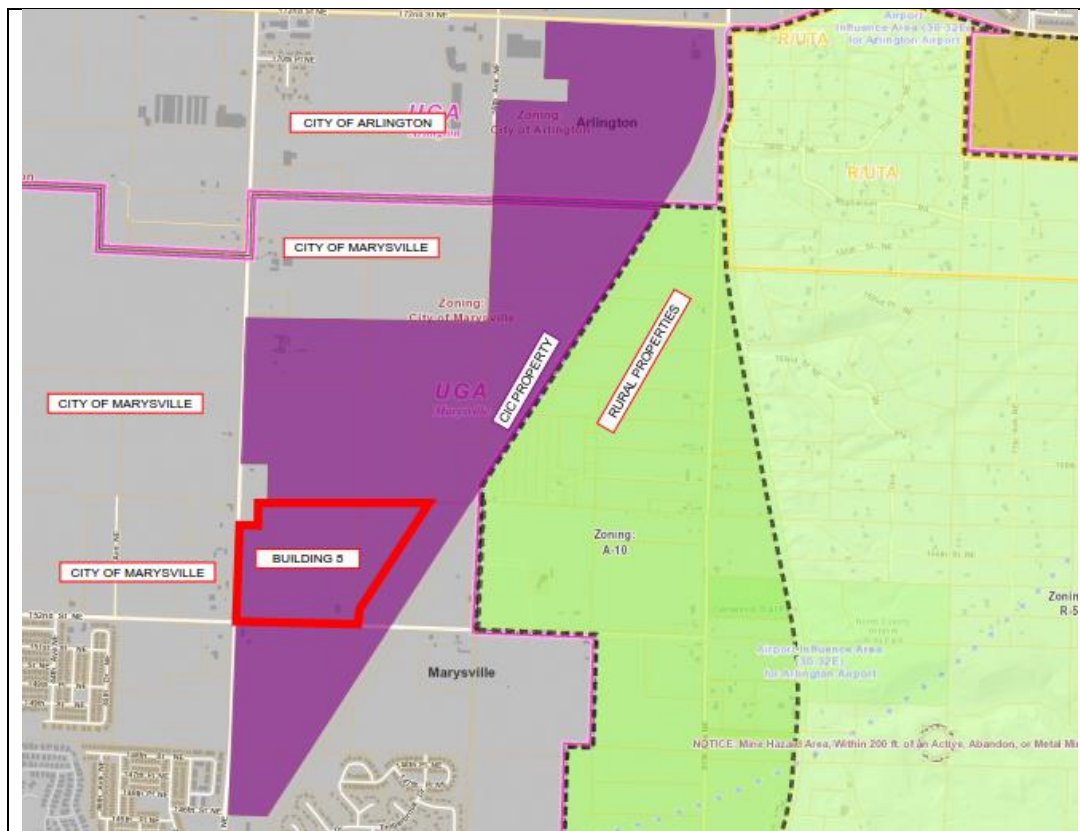


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15-minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to site is on the north side from the public road or from the southeast from the proposed public road.
 - The building has two loading docks, one on the north side and one on the side of the building with 55 truck bays each.
 - There are loading ramps along the east and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the east and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	N Loading Dock	7,200
		Truck Maneuvering	6,900
Northwest	Class B	N Loading Dock	2,800
		Truck Maneuvering	2,800
North	Class B	N Loading Dock	4,900
		Truck Maneuvering	4,900
Northeast	Class B	N Loading Dock	6,700
		Truck Maneuvering	6,400

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	S Loading Dock	800
		Truck Maneuvering	600
South	Class A	S Loading Dock	1,900
		Truck Maneuvering	1,900
North	Class C	N Loading Dock	2,100
		Truck Maneuvering	2,100
South	Class C	S Loading Dock	775
		Truck Maneuvering	525
West	Class C	N Loading Dock	550
		Truck Maneuvering	125

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	S Loading Dock	1,300
		Truck Maneuvering	700

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the PM peak hourly traffic volume generated at building 8 will be 250 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 38 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	38

There are estimated to be a maximum of 38 trucks travelling to/from the loading docks of building 8 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.



Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit ¹	75 dBA at 25 feet
Heavy truck idling ¹	72 dBA at 25 feet
Truck engines starting noises ¹	74 dBA at 25 feet
Roller door opening/closing ²	65 dBA at 25 feet
Air brakes ²	65 – 75 dBA at 25 feet
Pallet being dragged and dropped ²	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. ²	60 dBA at 25 feet

1. These events occur for approximately 1 minute.

2. These events occur for short durations, a few seconds or less in duration.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 1 minute. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the northwest, north, and northeast; and the nearest Class C EDNA properties to the north, south, and west.

Predicted Noise Levels – Truck Transit

The following section presents the predicted noise levels from the truck transit events to each of the receiving properties and compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	6,900 ft	-49	-0	26	30	41	38	21
SW	75	25 ft	600 ft	-28	-0	47	30	62	38	42
South	75	25 ft	1,900 ft	-38	-0	37	30	52	38	32
East	75	25 ft	700 ft	-29	-0	46	30	61	38	41

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NW	75	25 ft	2,800 ft	-41	-0	34	30	49	38	29
North	75	25 ft	4,800 ft	-46	-0	29	30	44	38	24
NE	75	25 ft	6,400 ft	-48	-0	27	30	42	38	22

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	2,100 ft	-38	-0	37	30	51	38	32
South	75	25 ft	525 ft	-26	-0	49	30	63	38	44
West	75	25 ft	125 ft	-14	-0	61	30	76	38	56

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following sections present the predicted noise levels from truck idling events to each of the receiving properties with the proposed mitigation. Trucks idling are predicted for a truck idling at the loading dock nearest the receiving property and compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	7,200 ft	-49	-0	23
SW Class A	72	25 ft	800 ft	-30	-0	42
South Class A	72	25 ft	1,900 ft	-38	-0	34
East Class A	72	25 ft	1,300 ft	-34	-0	38

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	72	25 ft	2,800 ft	-41	-0	31
North Class B	72	25 ft	4,900 ft	-46	-0	26
NE Class B	72	25 ft	6,700 ft	-49	-0	23

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	2,100 ft	-38	-0	34
South Class C	72	25 ft	775 ft	-30	-0	42
West Class C	72	25 ft	550 ft	-27	-0	45

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following sections present the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	7,200 ft	-49	-0	25
SW Class A	74	25 ft	800 ft	-30	-0	44
South Class A	74	25 ft	1,900 ft	-38	-0	36
East Class A	74	25 ft	1,300 ft	-34	-0	39

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	74	25 ft	2,800 ft	-41	-0	32
North Class B	74	25 ft	4,900 ft	-46	-0	28
NE Class B	74	25 ft	6,700 ft	-49	-0	25

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	2,100 ft	-38	-0	36
South Class C	74	25 ft	775 ft	-30	-0	44
West Class C	74	25 ft	550 ft	-27	-0	47

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following sections present the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	7,200 ft	-49	-0	26
SW Class A	75	25 ft	800 ft	-30	-0	45
South Class A	75	25 ft	1,900 ft	-38	-0	37
East Class A	75	25 ft	1,300 ft	-34	-0	40

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	75	25 ft	2,800 ft	-41	-0	33
North Class B	75	25 ft	4,900 ft	-46	-0	29
NE Class B	75	25 ft	6,700 ft	-49	-0	26

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	2,100 ft	-38	-0	37
South Class C	75	25 ft	775 ft	-30	-0	45
West Class C	75	25 ft	550 ft	-27	-0	48

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

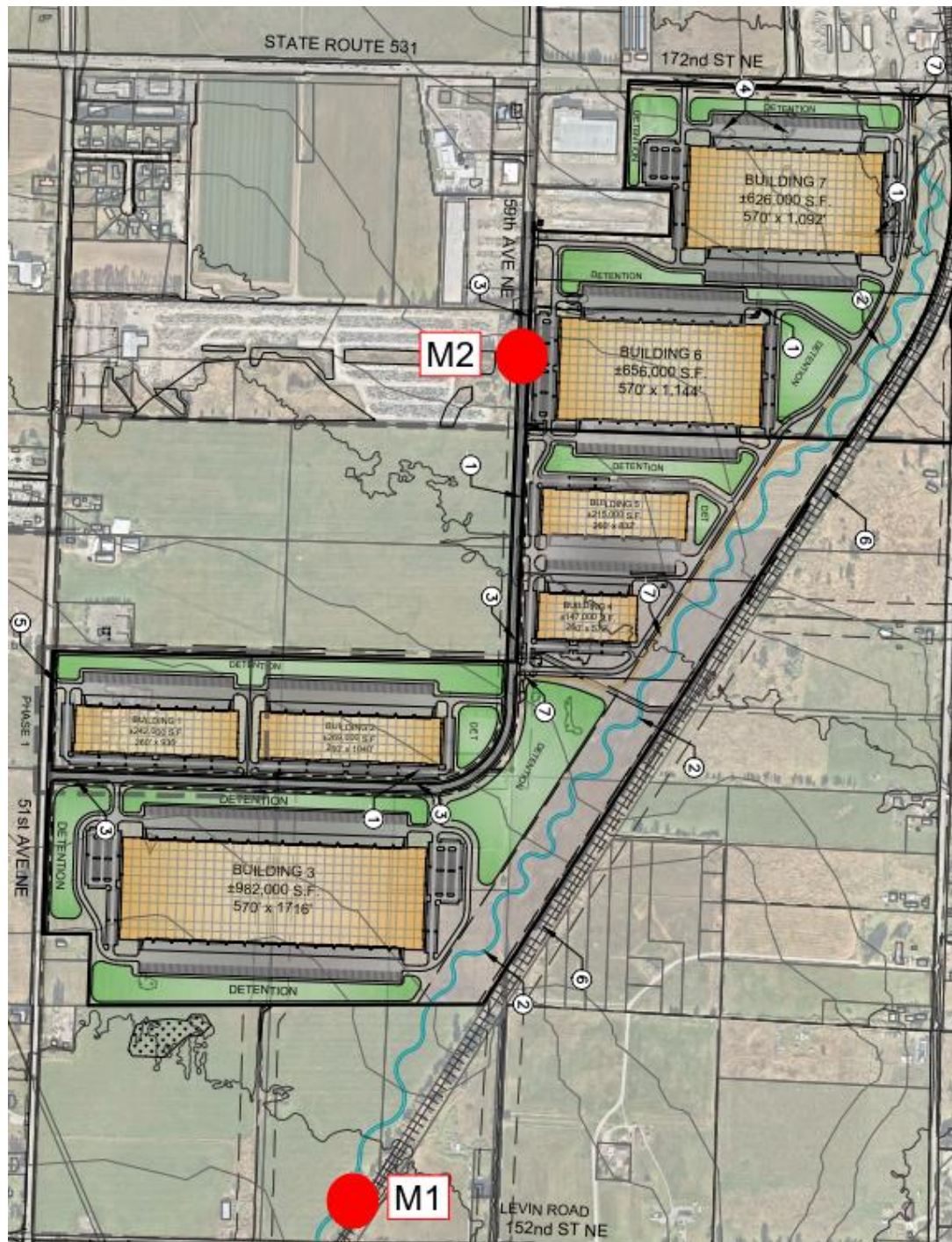
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, L_{eq} . The L_{eq} is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The L_{eq} is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

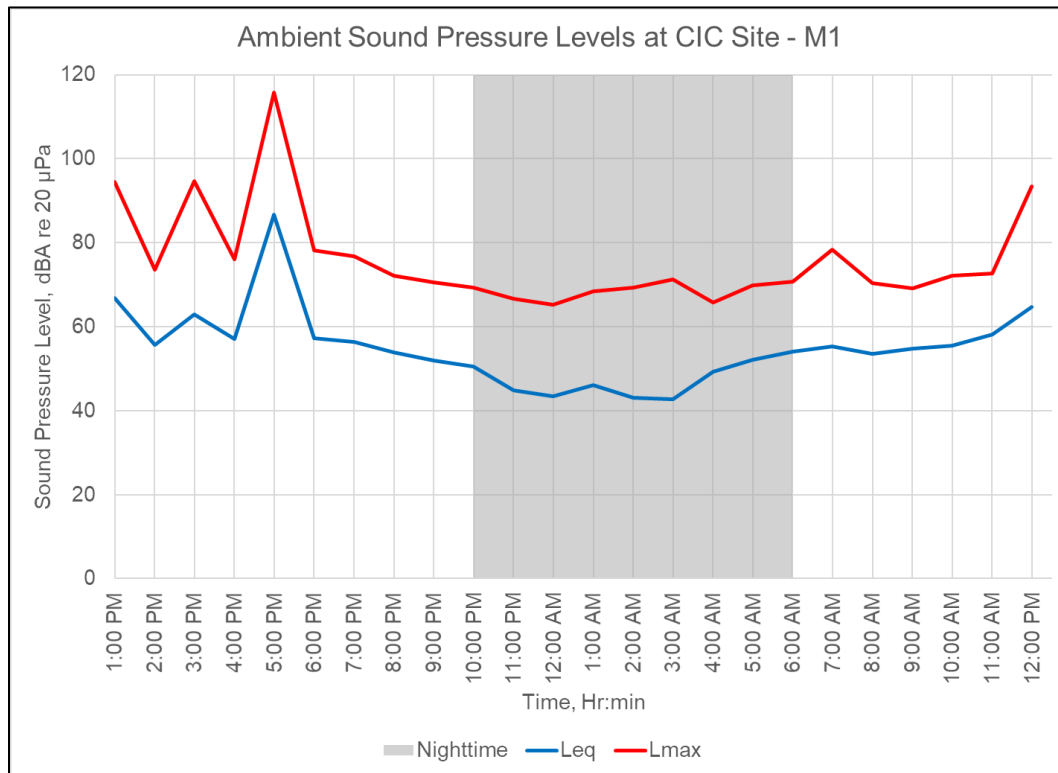


Figure 6: Hourly Noise Levels – Location M1

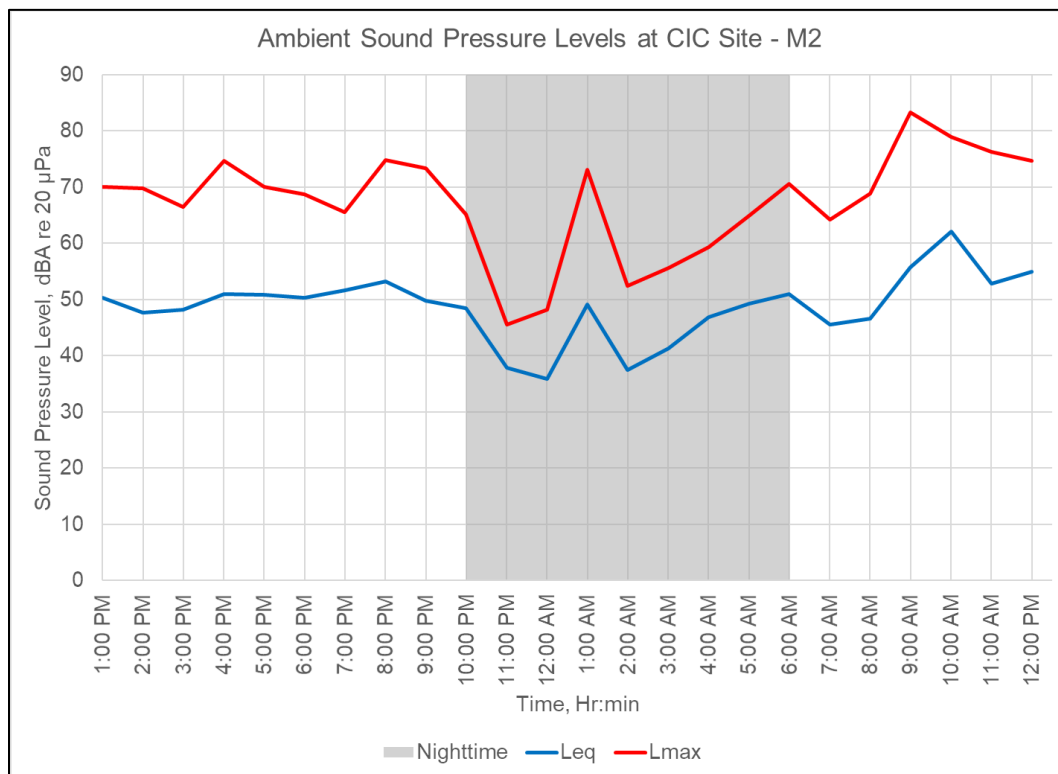


Figure 7: Hourly Noise Levels – Location M2



CASCADE INDUSTRIAL CENTER – BUILDING 9

SITE NOISE STUDY



Submitted to:

**Josh Wills
NorthPoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150**

DOCUMENT INFORMATION

FILE: Cascade Industrial Center Building 9
PROJECT #: 20-7619
PREPARED BY: Steve Hedback

SIGNED:



DATE: July 17, 2020

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorization of SSA Acoustics, LLP. SSA Acoustics, LLP accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/or SSA Acoustics, LLP and agree to indemnify SSA Acoustics, LLP for any and all resulting loss or damage. SSA Acoustics, LLP accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned. The findings and opinions expressed are relevant to the dates of the works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations SSA Acoustics, LLP reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

I. INTRODUCTION / EXECUTIVE SUMMARY

This report presents the results of an environmental noise study conducted for Building 9 of the proposed Cascade Industrial Center project. The proposed site is located to the off 51st Ave NE north of 152nd ST NE and south of 172nd St NE in Marysville, WA. The purpose of the study is to document the extent of impact of noise from truck traffic and loading operation associated with the site to the surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County. Noise levels from the site were predicted to the receiving properties and compared to the exterior sound level limits established by applicable code requirements.

Noise levels from truck / loading operations at the proposed site are predicted to the surrounding industrial properties and to the nearest commercial and residential properties.

See Appendix I for descriptions and definitions of acoustical terminology used in this report.

The following figure presents the proposed Cascade Industrial Center project site with Building 9 outlined in red.

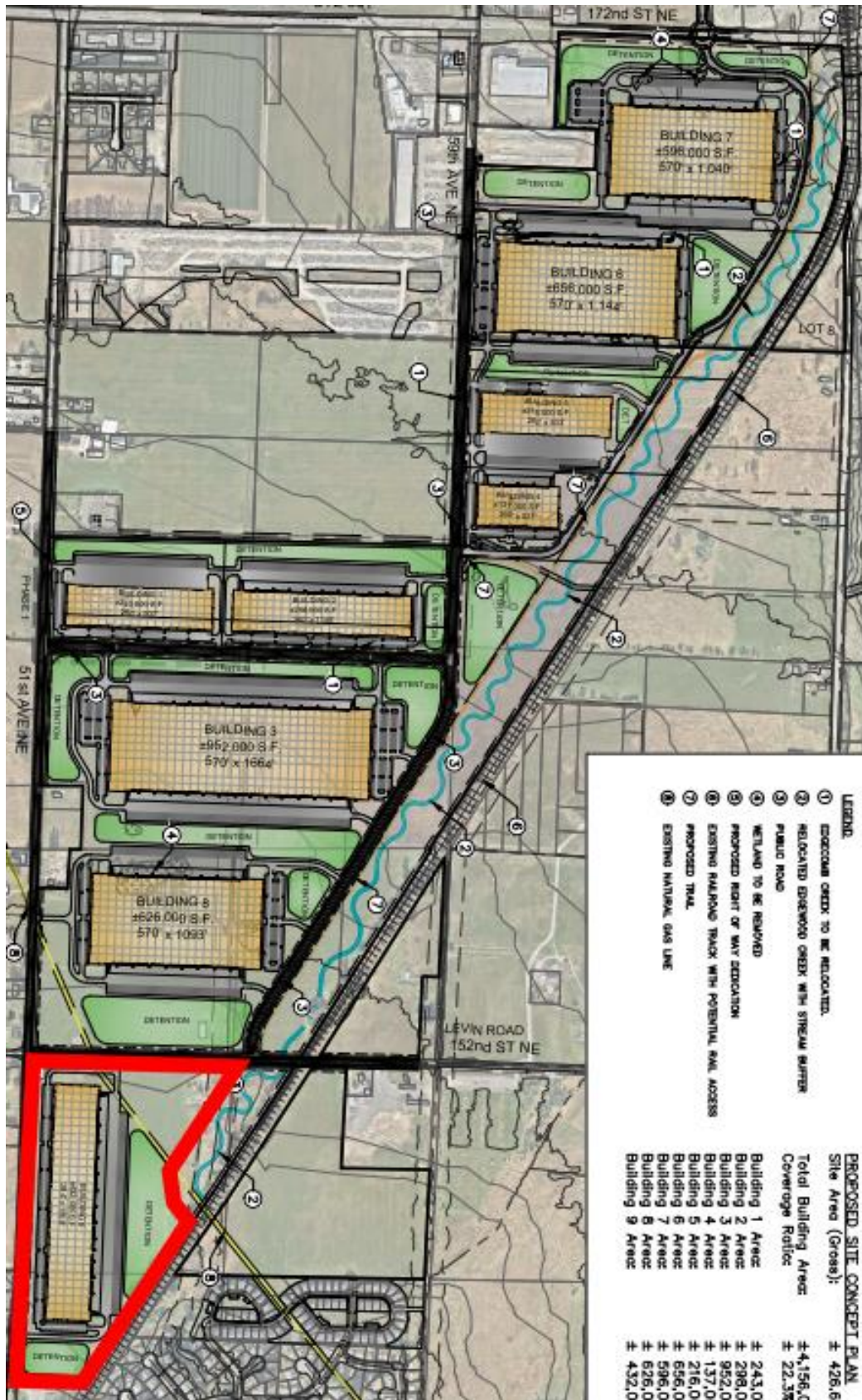


Figure 1: Cascade Industrial Center

II. PROJECT SITE AND ZONING

The project site is located within the City of Arlington and the City of Marysville, and borders properties within unincorporated Snohomish County. According to the City of Arlington, the City of Marysville, and Snohomish County, the project site and nearest adjacent properties are currently zoned as follows:

Table 1: Site and Surrounding Properties Zoning

Property	Jurisdiction	Zoning	Classification
Project Site	Arlington & Marysville	LI	Industrial
NE	Arlington	RMD	Residential
SW	Marysville	R18 Multi-Family	Residential
South	Marysville	R4.5 Single Family	Residential
East	Snohomish	A-10 Agriculture	Rural
NW	Arlington	GC	Commercial
North	Arlington	GC	Commercial
NE	Arlington	NC	Commercial
North	Marysville	LI	Industrial
East	Marysville	LI	Industrial
NW	Marysville	LI	Industrial

The following figures present the zoning of the proposed site and surrounding properties within the City of Arlington, the City of Marysville, and Snohomish County:

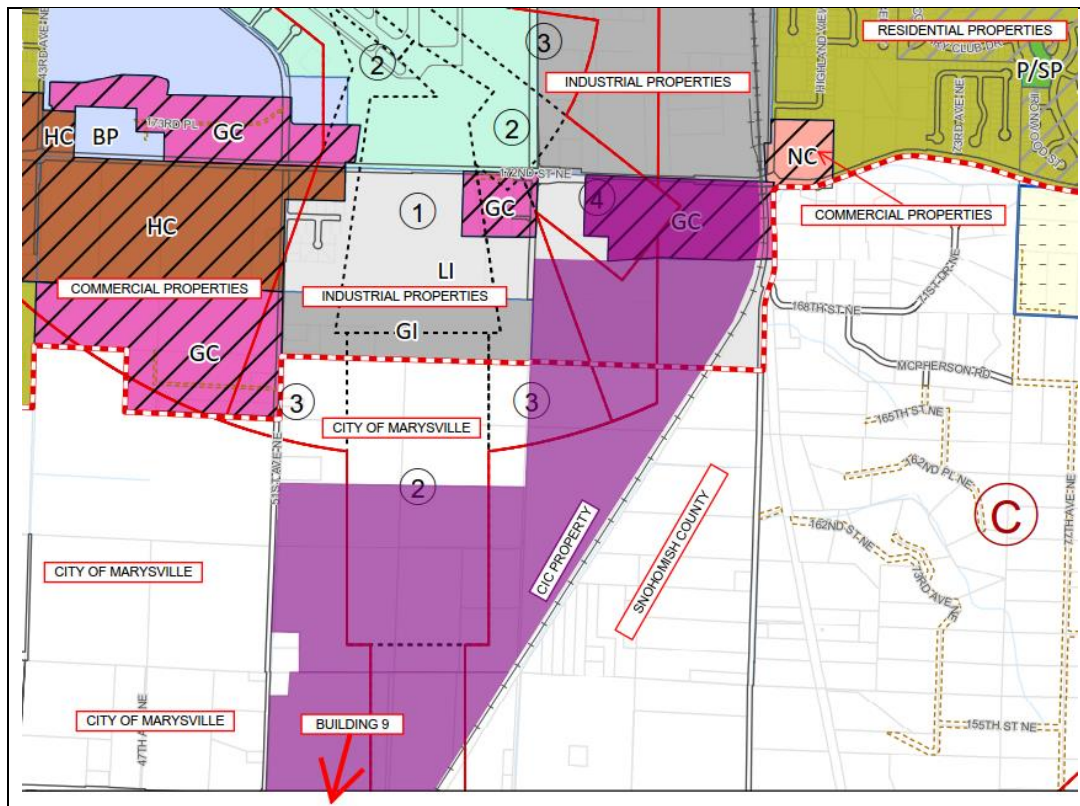


Figure 2: Site and Surrounding Properties – City of Arlington

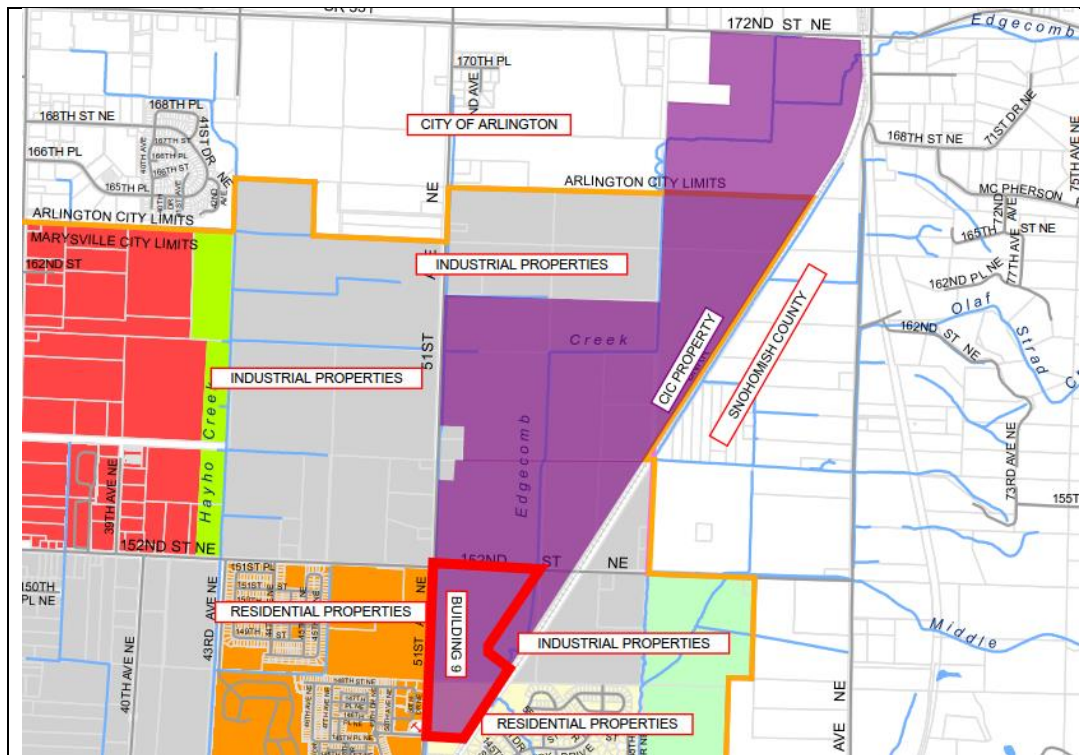


Figure 3: Site and Surrounding Properties – City of Marysville

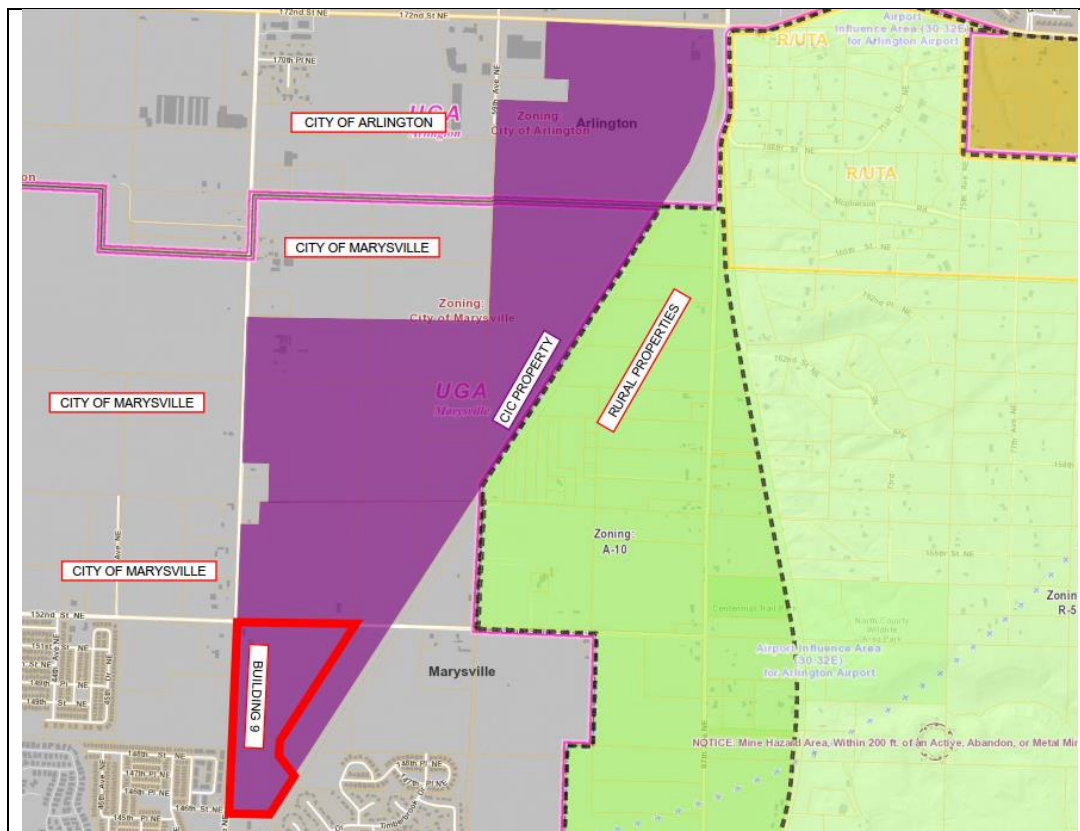


Figure 4: Site and Surrounding Properties – Snohomish County

III. IMPACT REGULATIONS AND CRITERIA

The project site is located within the City of Arlington and City of Marysville zoning jurisdiction, which both adopt Washington Administrative Code Chapter 173-60 for noise standards.

Washington Administrative Code

Under WAC 173-60 the maximum permissible sound levels are established based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The maximum permissible Leq noise levels from WAC 173-60-040, based on the source and receiving properties are shown in the table below.

EDNA OF NOISE SOURCE	EDNA OF RECEIVING PROPERTY		
	CLASS A	CLASS B	CLASS C
CLASS A (Residential Use)	55 dBA	57 dBA	60 dBA
CLASS B (Commercial Use)	57	60	65
CLASS C (Industrial Use)	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within Class A EDNAs.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

Arlington Municipal Code

The City of Arlington Municipal Code section 20.44.210 adopts Washington Administrative Code Chapter 173-60 as described above. Subsection (c) designated the following zones to the EDNA's as follows:

1. SR, RLMD, RMD, RHD, and OTR – Class A EDNA
2. NC, OTB, GC, and HC – Class B EDNA
3. BP, A, LI, and I – Class C EDNA
4. P/SP – shall conform to the EDNA that conforms to the zoning designation that predominantly surrounds the P/SP parcel.

Marysville Municipal Code

The City of Marysville Municipal Code section 6.76.040 adopts Washington Administrative Code Chapter 173-60-040 as described above. Section 6.76.030 designated the following zones to the EDNA's as follows:

1. Class A EDNA. Lands where human beings reside and sleep, including all properties in the city which are zoned in single-family residential or multiple-family residential classifications.
2. Class B EDNA. Lands involving uses requiring protection against noise interference with speech, including all properties in the city which are zoned in neighborhood business, community business, and general commercial classifications.
3. Class C EDNA. Lands involving economic activities of such a nature that higher noise levels than experienced in other areas are normally to be anticipated. Persons working in these areas are normally covered by noise control regulations of the Department of Labor and Industries. Such areas shall include all properties in the city which are zoned in light industrial and general industrial classifications.

Noise levels at the receiving properties are subject to the code requirements governed by the source property zoning jurisdiction. The following are the noise code requirements for Snohomish County, which are provided for reference:

Snohomish County Code

Snohomish County Code chapter 10.01 provides noise limits for properties within unincorporated Snohomish County. Section 10.01.030 establishes the maximum permissible sound levels based on the district of the source and receiving properties. The maximum permissible Leq noise levels from SCC 10.01.030, based on the source and receiving properties are shown in the table below:

DISTRICT OF RECEIVING PROPERTY	DISTRICT OF NOISE SOURCE			
	RURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
RURAL	49	52	55	57
RESIDENTIAL	52	55	57	60
COMMERCIAL	55	57	60	65
INDUSTRIAL	57	60	65	70

Between the hours of 10:00 pm and 7:00 am the noise limits in the table above are to be reduced by 10 dBA for receiving properties within rural or residential districts.

During any single hour in the evening or daytime the noise limits in the table above may be exceeded for any receiving property by the following:

1. 5 dBA for a total of 15 minutes (25%) in any one-hour period.
2. 10 dBA for a total of 5 minutes (8%) in any one-hour period.
3. 15 dBA for a total of 1.5 minutes (2.5%) in any one-hour period.

According to WAC standards, noise from a Class C EDNA is limited as follows, based on the EDNA of the receiving property:

Class A EDNA Receiver: Noise is limited to 60 dBA during daytime hours. During nighttime hours, between the hours of 10 p.m. and 7 a.m., the maximum permissible sound level is decreased by 10 decibels.

Class B EDNA Receiver: Noise is limited to 65 dBA at all hours of the day.

Class C EDNA Receiver: Noise is limited to 70 dBA at all hours of the day.

Additionally, during any one-hour period the noise limits may be exceeded for any receiving property by the following:

- 5 dBA for a total of 15 minutes in any one-hour period.
- 10 dBA for a total of 5 minutes in any one-hour period.
- 15 dBA for a total of 1.5 minutes in any one-hour period.

Since the truck and loading dock operations will occur during daytime hours, they must not exceed the daytime hourly noise limits at the Class A EDNA receiving properties.

Medium duration events, which occur for a duration of no more than 15-minutes during any one hour period, are subject to the 5 dBA allowable exceedance to the hourly limit.

Short-term events, which occur for a duration of no more than 1.5-minutes during any one hour period, are subject to the 15 dBA allowable exceedance to the hourly limit.

Ambient Conditions

Existing ambient noise levels were measured on site between July 8 and July 9, 2020 with two Svantek 971 noise monitors. The following table presents a summary of the hourly noise levels during daytime and nighttime hours:

Table 2: Measured Ambient Noise Levels

Time Period	Hourly Sound Level Range, dBA Leq
Daytime (7 AM – 10 PM)	46 – 87
Nighttime (10 PM – 7 AM)	36 – 54

Please refer to the appendix for more information regarding the site noise measurements.

IV. SITE OPERATIONS

Site Description:

The proposed site has the following elements:

- The proposed site consists of one building which will be used for warehousing.
- Locations of operations
 - The truck entrance to site is on the north side or southwest from the public road.
 - The building has one loading dock on the south side of the building with 91 truck bays.
 - There are loading ramps along the north and west sides of the loading docks.
 - These will be used for small deliveries, such as from UPS.
 - There is small vehicle (personal vehicles) parking along the south and west sides of the building.
- Operation in relation to the receiving properties
 - The following table presents the distance from each source area associated with the site to the nearest receiving property in the Arlington jurisdiction:

Table 3: Arlington Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Northeast	Class A	E Loading Dock	8,900
		Truck Maneuvering	8,700
Northwest	Class B	E Loading Dock	4,300
		Truck Maneuvering	4,100
North	Class B	E Loading Dock	6,500
		Truck Maneuvering	6,300
Northeast	Class B	E Loading Dock	8,400
		Truck Maneuvering	8,200

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Marysville jurisdiction:

Table 4: Marysville Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
Southwest	Class A	E Loading Dock	550
		Truck Maneuvering	200
South	Class A	E Loading Dock	300
		Truck Maneuvering	200
North	Class C	E Loading Dock	3,600
		Truck Maneuvering	3,400
South	Class C	E Loading Dock	475
		Truck Maneuvering	425
West	Class C	E Loading Dock	650
		Truck Maneuvering	625

- The following table presents the distance from each source area associated with the site to the nearest receiving property in the Snohomish County jurisdiction:

Table 5: Snohomish County Jurisdiction Receiving Property Distances

Receiving property	EDNA	Source Area	Distance
East	Class A	E Loading Dock	1,500
		Truck Maneuvering	1,400

- Hours of operation are assumed to be 24/7 but will depend ultimately on the tenant.

Noises associated with the site related to truck and loading dock activity would typically include truck transit, startup and idling, air brakes, backup beepers, and loading activities.

Trucks will enter the property from 51st Ave NE or the proposed public road, and will load/unload at the loading docks. Once the loading / unloading process is complete, the trucks would then exit the facility through the entrance along 51st Ave NE or the proposed public road. No trucks will be maneuvering through the parking lots on the south and east sides of the building.

Truck Traffic

Truck traffic information was provided by the transportation engineer in the document title Traffic Scoping Memo for the proposed Lakewood 90 Project - TENW Project No. 2020-213 dated October 13, 2020. The following table presents the applicable predicted new vehicle trips generated at the site:

Table 6: Total Trip Generation at Site

Building	Size	ITE Land Use Code	PM High Impact Peak Hour Trips (Total)
Building 1	243,000 sq. ft.	Industrial Park (130)	97
Building 2	298,000 sq. ft.	Industrial Park (130)	119
Building 3	952,000 sq. ft.	High Cube Fulfillment (155)	562
Building 4	137,000 sq. ft.	Industrial Park (130)	55
Building 5	216,000 sq. ft.	Industrial Park (130)	86
Building 6	656,000 sq. ft.	High Cube Fulfillment (155)	52
Building 7	596,000 sq. ft.	High Cube Fulfillment (155)	48
Building 8	626,000 sq. ft.	Industrial Park (130)	250
Building 9	432,000 sq. ft.	High Cube Fulfillment (155)	35

As shown in the traffic study conducted for the site, the PM peak hourly traffic volume generated at building 9 will be 35 vehicles, and heavy trucks will be about 15% of the vehicles, or approximately 6 heavy trucks during PM peak hour.

The estimated highest number of trucks travelling to or from the building during a one-hour period (PM Peak hour) are assumed to be as follows:

Table 7: Hourly Truck Trips at Site

	Max Hourly
Truck Events	6

There are estimated to be a maximum of 6 trucks travelling to/from the loading docks of building 9 during peak traffic volume.

The following figure presents a plan of the site indicating the loading docks and truck maneuvering area.

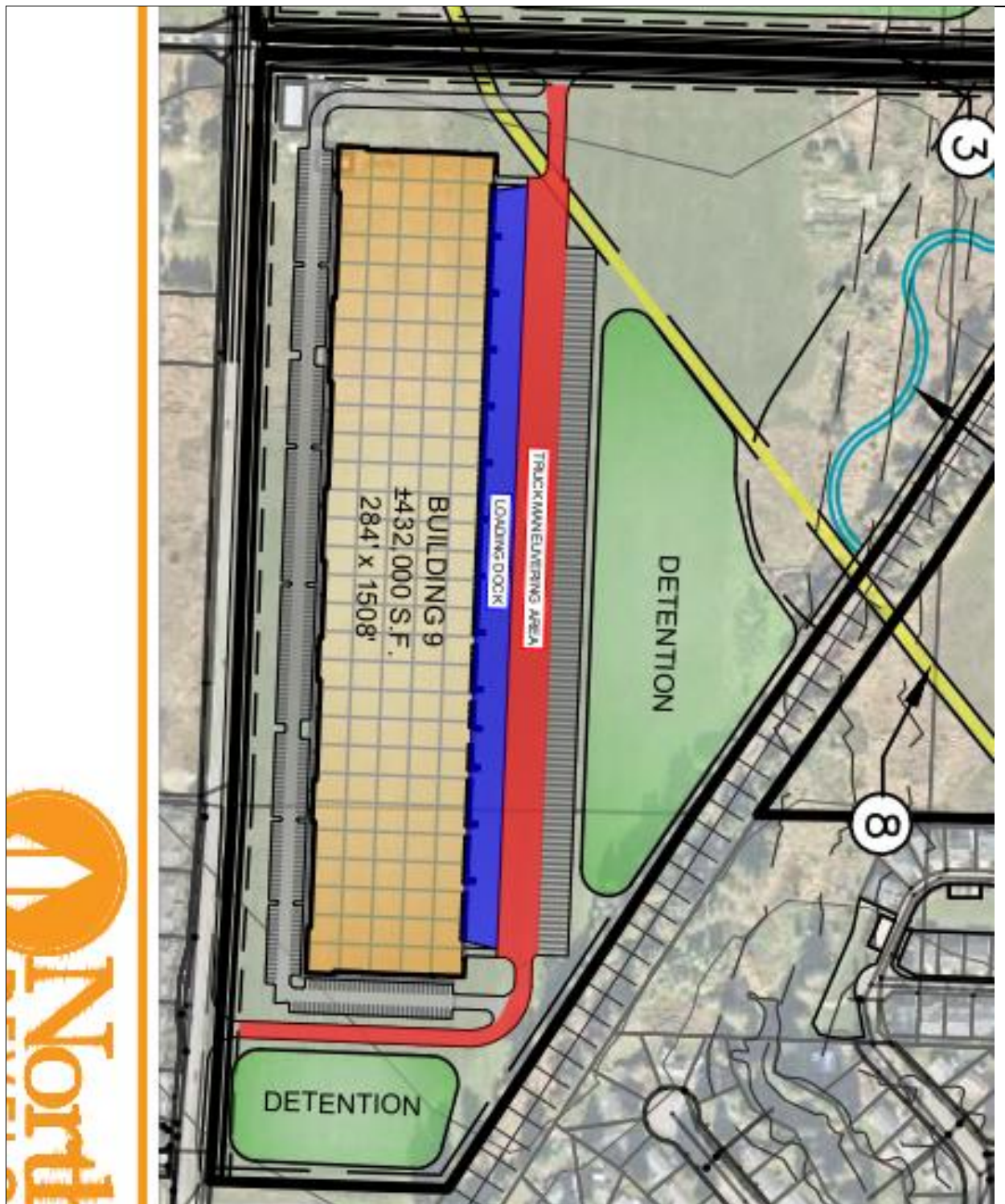


Figure 5: Site Plan

Site Generated Noise Sources

The following is a summary of typical noise levels from sources associated with the site:

Table 8: Source Sound Pressure Levels

Truck Events	Noise Level
Truck Transit ¹	75 dBA at 25 feet
Heavy truck idling ¹	72 dBA at 25 feet
Truck engines starting noises ¹	74 dBA at 25 feet
Roller door opening/closing ²	65 dBA at 25 feet
Air brakes ²	65 – 75 dBA at 25 feet
Pallet being dragged and dropped ²	75 dBA at 25 feet
Pallet jack rolling into truck, hitting bumps, etc. ²	60 dBA at 25 feet

1. These events occur for approximately 1 minute.

2. These events occur for short durations, a few seconds or less in duration.

Truck transit consists of a truck pulling into the site, traveling to the loading dock, and backing into the dock door. The loading dock will have rubberized bumpers, and the truck hitting the loading dock is included in the source noise level. Truck transit events where trucks pass closest to receiving properties will last up to 30 seconds.

Truck idling occurs just after entering a loading bay and prior to leaving a truck bay. Signage and other means of minimizing truck idling will be provided to prevent longer idle durations. Trucks idling will typically occur for between one and five minutes, with a total duration of less than 15 minutes during a one-hour period.

Loading activities, which include forklifts, pallet jacks, and moving pallets and materials, will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors are assumed to be closed except where a truck is loading. Backup beepers would be installed on forklifts which will be operating within the warehouse.

Backup beepers are warning devices and are therefore exempt under WAC 173-60-050 (4) (d) such that they are not operating continuously for more than five minutes.

Trucks will not be using backup beepers. The area where the trucks will be backing into the loading dock is not an active pedestrian working area, where backup beepers are not required.

Truck transit on the site, trucks idling, truck engines starting, and truck air brakes will be the primary exterior noise sources at the site.

Truck transit events where trucks pass closest to receiving properties will last for up to 1 minute. Trucks idling are assumed to idle for no more than a few minutes before transit or after parking, less than a total of 15 minutes during a one-hour period. Air brakes associated with truck activity are essentially instantaneous or last no more than a few seconds and would last less than a total of 1.5 minutes during a one-hour period.

V. PREDICTED SOUND LEVELS

The following sections provide the predicted sound levels from truck events to the nearest receiving properties. Truck events include trucks in transit, trucks idling, engine start, and application of air brakes.

The following is a summary of typical noise levels generated by truck activity:

Table 9: Source Noise Levels and Durations

Truck Condition / Source	dBA @ 25'	Event Duration
Truck Transit (10 – 25 mph)	75	30 seconds
Truck Idle	72	1 – 5 minutes
Truck Engine Start	75	(few seconds)
Air Brakes	75	1 second or less

Loading activities will occur within the warehouse and truck cargo area which will contain the noise to within the warehouse and truck cargo area. Warehouse doors will be closed when a truck is not at the respective loading dock.

Noise levels were predicted based on distance attenuation. Noise reduction due to intervening elements, such as earth berms, barrier walls, and buildings were accounted for in the calculations.

Distances from each source to the receiving properties were based on the closest possible source location to the nearest receiving properties. Truck engine starts, idling, and air brakes are assumed to occur at a loading dock where a truck will be parked. Truck transit occurs within the truck maneuvering area.

Noise levels were evaluated to the nearest Class A EDNA properties to the northeast, southwest, south, and east; the nearest Class B EDNA properties to the northwest, north, and northeast; and the nearest Class C EDNA properties to the north, east, and northwest. The building will effectively block noise associated with the loading docks to the west and northwest receiving properties.

Predicted Noise Levels – Truck Transit

The following section presents the predicted noise levels from the truck transit events to each of the receiving properties and compared to the hourly code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 10: Predicted Noise Levels @ Class A Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NE	75	25 ft	8,700 ft	-51	-0	24	30	39	5	10
SW	75	25 ft	200 ft	-18	-0	57	30	72	5	43
South	75	25 ft	200 ft	-18	-0	57	30	72	5	43
East	75	25 ft	1,400 ft	-35	-0	40	30	55	5	26

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class A EDNA receiving properties will be within the 60 dBA daytime and 50 dBA nighttime hourly code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 11: Predicted Noise Levels @ Class B Receiving Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
NW	75	25 ft	4,100 ft	-44	-0	31	30	45	5	17
North	75	25 ft	6,300 ft	-48	-0	27	30	42	5	13
NE	75	25 ft	8,200 ft	-50	-0	25	30	39	5	11

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class B EDNA receiving properties will be within the 65 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from truck transit. Distance was calculated from the closest portion of the maneuvering area to the receiving property for a truck in transit on the site.

Table 12: Predicted Noise Levels @ Class C Properties – Truck Transit

Rcvr.	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)	Event Duration (s)	SEL ³	Events per Hour	Hourly Leq at Rcvr. ⁴
North	75	25 ft	3,400 ft	-43	-0	32	30	47	5	19
East	75	25 ft	425 ft	-25	-0	50	30	65	5	37
NW	75	25 ft	625 ft	-28	-10	37	30	52	5	23

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

3. SEL = $(Lp, r) + 10 \cdot \log(\text{Event Duration (s)})$

4. Hourly Leq at Receiver = $(SEL) + 10 \cdot \log(\text{Events per Hour}) - 10 \cdot \log(3600)$

According to the table above, the predicted sound pressure levels from the truck transit on the site at the surrounding Class C EDNA receiving properties will be within the 70 dBA hourly code limit.

Additionally, noise levels from the truck transit are predicted to be within or below the range of ambient noise levels measured at the site.

Predicted Noise Levels – Truck Idling

The following sections present the predicted noise levels from truck idling events to each of the receiving properties with the proposed mitigation. Trucks idling are predicted for a truck idling at the loading dock nearest the receiving property and compared to the 15-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 13: Predicted Noise Levels @ Class A Properties – Truck Idling

Receiver	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	72	25 ft	8,900 ft	-51	-0	21
SW Class A	72	25 ft	550 ft	-27	-13	32
South Class A	72	25 ft	300 ft	-22	-0	50
East Class A	72	25 ft	1,500 ft	-36	-0	36

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class A EDNA receiving properties will be within the 65 dBA daytime and 55 dBA nighttime 15-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 14: Predicted Noise Levels @ Class B Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	72	25 ft	4,300 ft	-45	-0	27
North Class B	72	25 ft	6,500 ft	-48	-0	24
NE Class B	72	25 ft	8,400 ft	-51	-0	21

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class B EDNA receiving properties will be within the 70 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 15: Predicted Noise Levels @ Class C Properties – Truck Idling

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	72	25 ft	3,600 ft	-43	-0	29
East Class C	72	25 ft	475 ft	-26	-13	46
NW Class C	72	25 ft	650 ft	-28	-0	31

1. Distance Attenuation Factor = $-10 \cdot \log(Q) + 20 \cdot \log(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the truck idling on the site at the surrounding Class C EDNA receiving properties will be within the 75 dBA 15-minute code limit.

Additionally, noise levels from the truck idling are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Engine Start

The following sections present the predicted noise levels from the engine start events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 16: Predicted Noise Levels @ Class A Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	74	25 ft	8,900 ft	-51	-0	23
SW Class A	74	25 ft	550 ft	-27	-13	34
South Class A	74	25 ft	300 ft	-22	-0	52
East Class A	74	25 ft	1,500 ft	-36	-0	38

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 17: Predicted Noise Levels @ Class B Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	74	25 ft	4,300 ft	-45	-0	29
North Class B	74	25 ft	6,500 ft	-48	-0	26
NE Class B	74	25 ft	8,400 ft	-51	-0	23

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class B EDNA receiving properties will be within the 80 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the engine start noises. Distance to the receiving property was determined from a truck parked at the loading dock closest to the respective receiving property.

Table 18: Predicted Noise Levels @ Class C Properties – Engine Start

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	74	25 ft	3,600 ft	-43	-0	31
East Class C	74	25 ft	475 ft	-26	-13	48
NW Class C	74	25 ft	650 ft	-28	-0	33

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the engine starting on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the engine starts are predicted to be within or below the range of measured noise levels at the site.

Predicted Noise Levels – Air Brakes

The following sections present the predicted noise levels from the air brake events to each of the receiving properties. These events have a short duration and are therefore compared to the 1.5-minute code limit.

Class A EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class A EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 19: Predicted Noise Levels @ Class A Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NE Class A	75	25 ft	8,900 ft	-51	-0	24
SW Class A	75	25 ft	550 ft	-27	-13	35
South Class A	75	25 ft	300 ft	-22	-0	53
East Class A	75	25 ft	1,500 ft	-36	-0	39

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class A EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit. Noise levels at the properties to the east within Snohomish County are also within the hourly limits under Snohomish County Code.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class B EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class B EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 20: Predicted Noise Levels @ Class B Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
NW Class B	75	25 ft	4,300 ft	-45	-0	30
North Class B	75	25 ft	6,500 ft	-48	-0	27
NE Class B	75	25 ft	8,400 ft	-51	-0	24

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class B EDNA receiving properties will be within the 75 dBA daytime and 65 dBA nighttime 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

Class C EDNA Receiving Properties

The following table presents a summary of predicted noise levels at the nearest Class C EDNA receiving property lines from the air brake noises. Distance to the receiving property was determined from a truck parked at the nearest loading dock to the receiving property.

Table 21: Predicted Noise Levels @ Class C Properties – Air Brakes

Receiving Property	Lp, s (dBA)	Ref. Dist.	Rcvr. Dist.	Distance Atten. ¹	Barrier Atten. ²	Lp, r (dBA)
North Class C	75	25 ft	3,600 ft	-43	-0	32
East Class C	75	25 ft	475 ft	-26	-13	49
NW Class C	75	25 ft	650 ft	-28	-0	34

1. Distance Attenuation Factor = $-10 \cdot \text{LOG}(Q) + 20 \cdot \text{LOG}(R2/R1)$

2. Barrier Attenuation due to Intervening Building or Barrier

According to the table above, the predicted sound pressure levels from the air brakes on the site at the surrounding Class C EDNA receiving properties will be within the 85 dBA 1.5-minute code limit.

Additionally, noise levels from the air brakes are predicted to be within or below the range of measured noise levels at the site.

VIII. SUMMARY

This report has provided the results of the site noise study from the proposed facility to the neighboring properties. Predicted noise levels were compared and evaluated relative to the City of Marysville Municipal Code, City of Arlington Municipal Code, and Snohomish County Code sections for maximum permissible sound levels. The results of the study show that the truck activity will meet the daytime and nighttime code limits at the nearest receiving properties.

Please contact us if you have questions or need further information.

APPENDIX I: ACOUSTICAL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. The human ear responds differently to sounds at different frequencies. This is demonstrated by the fact that we hear higher pitched sounds more easily than lower ones of the same magnitude. To compensate for the different “loudness” as perceived by humans, a standard weighting curve is applied to measured sound levels. The weighting curve represents the frequency response of the human ear and is labeled as dBA (“A” weighted decibels).

People normally experience sound levels between 30 and 90 dBA, depending on their activities. Locations near highways or urban arterials may be 70 dBA, whereas quiet rural areas may be 40 dBA.

Each 10 dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered just noticeable are about 2 to 3 dBA.

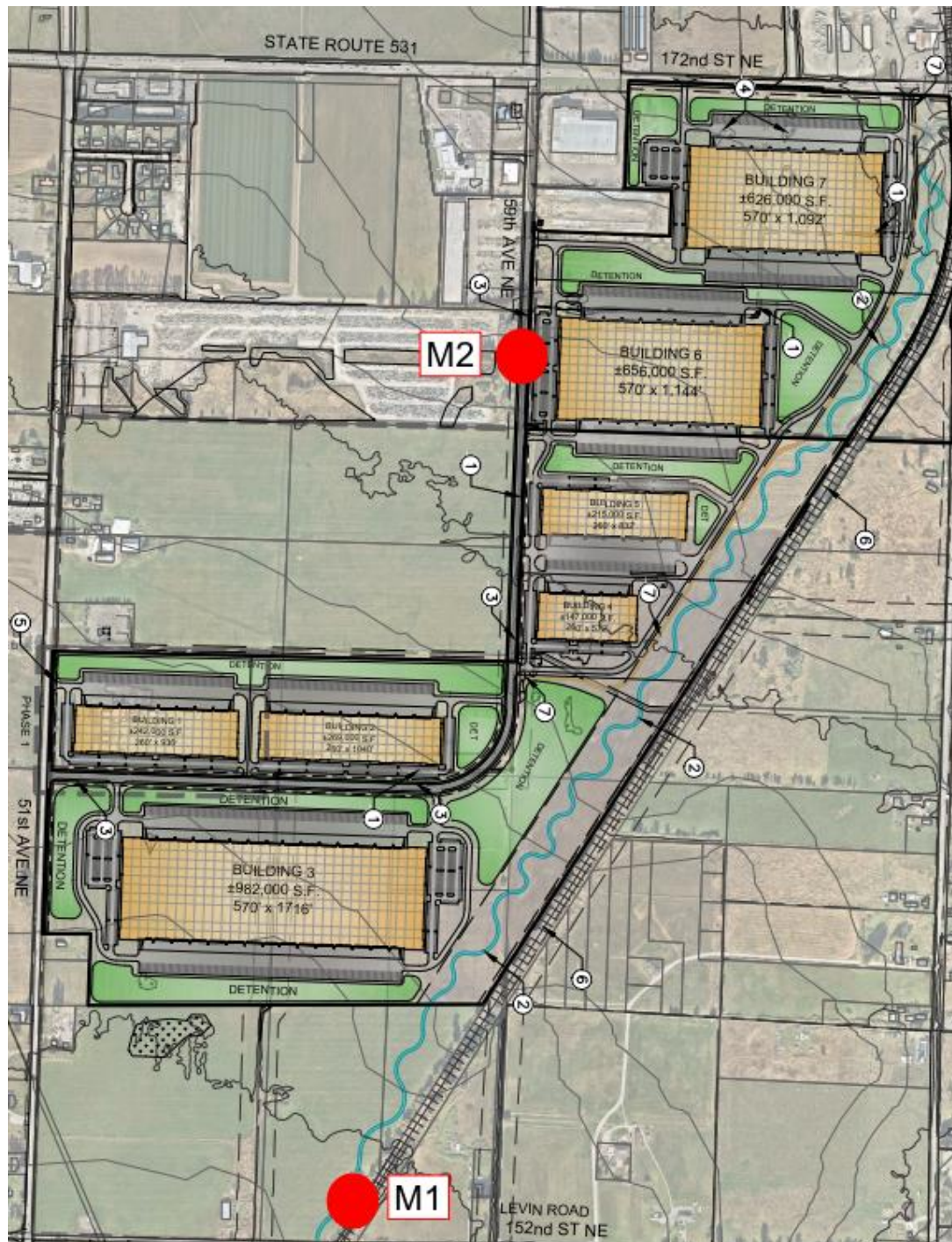
Sound levels from two or more sources are combined logarithmically, not by adding the levels arithmetically. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA; 50 dBA combined with 40 dBA results in 50.4 dBA, which is rounded off to 50 dBA since fractions of a dB are negligible from the point of view of perception of environmental noise.

When measuring noise that is fluctuating over time, it is common practice to use a descriptor called equivalent A-weighted sound level, L_{eq} . The L_{eq} is that constant sound level in dBA which contains the same amount of sound energy over a given time period as the measured fluctuating noise. The L_{eq} is often determined for one-hour time periods.

Another descriptor is the L_{max} . The L_{max} is the highest instantaneous sound level for a given sound event or time period. Similarly, L_{min} is the lowest instantaneous sound level for a given sound event or time period.

APPENDIX II: ACOUSTICAL MEASUREMENTS

Hourly monitoring of noise levels at the site were conducted on the east portion of the lot with two Svantek 971 type 1 sound level meters. The monitor was set to record noise levels over a 24 hour period from 1:00 PM on July 8 to 1:00 PM on July 9, 2020. The following figure presents the locations of each of the measurements.



The following charts present the results of the monitoring at locations M1 and M2:

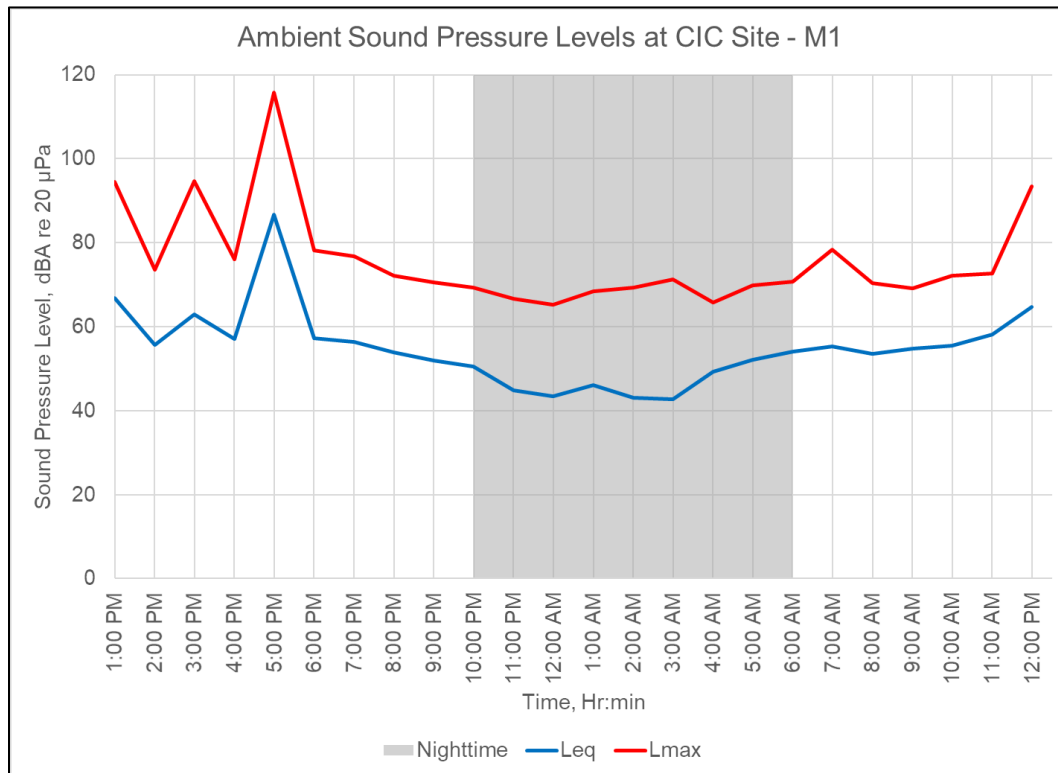


Figure 6: Hourly Noise Levels – Location M1

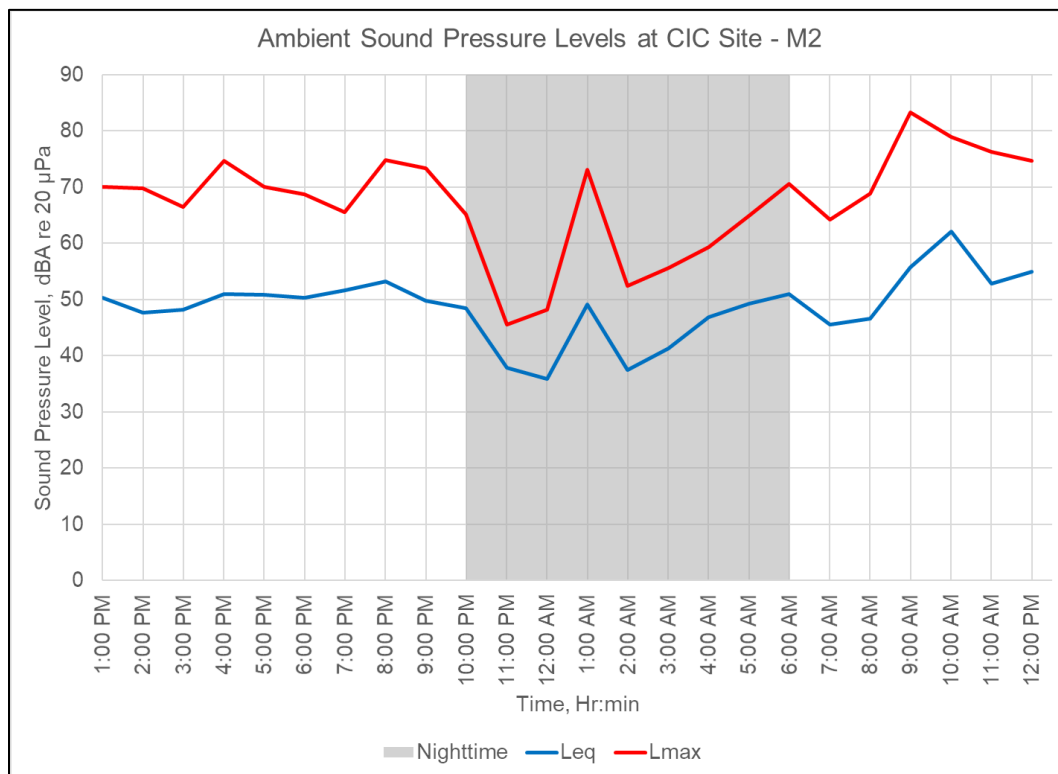


Figure 7: Hourly Noise Levels – Location M2